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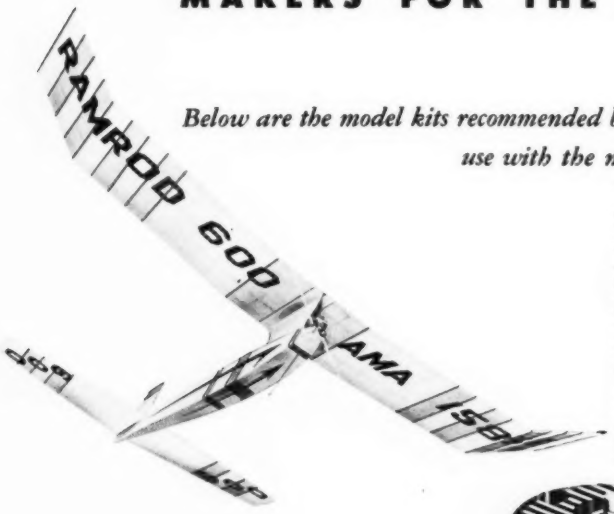
MODEL AIRPLANE NEWS

OCTOBER 1958—35 CENTS

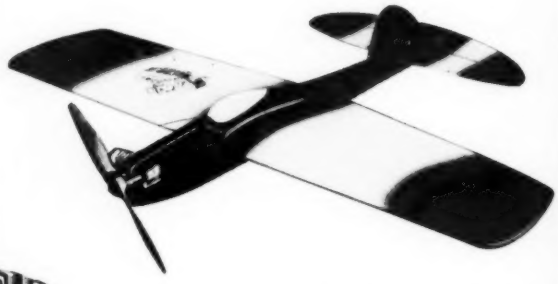
Fleet Biplane

MODEL KITS RECOMMENDED BY MAKERS FOR THE NEW FOX 15

Below are the model kits recommended by nationally-known manufacturers as being ideal for use with the new FOX 15 motor

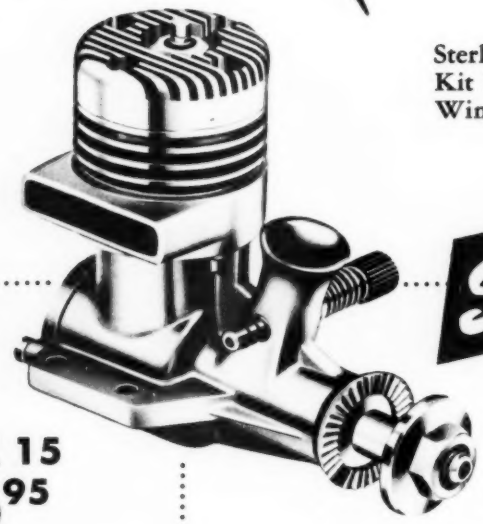


Berkley's "Ramrod 600."
Kit No. 17-7.
Wingspan 63".



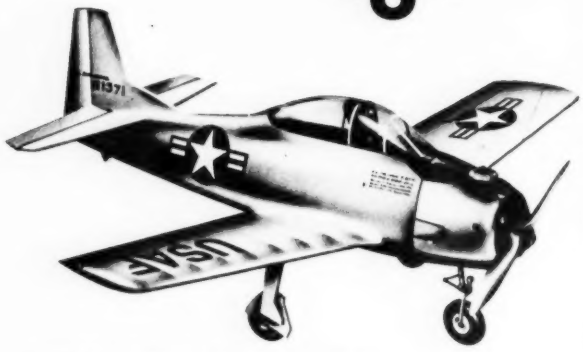
Sterling's "Ringmaster Jr."
Kit No. S-5.
Wingspan 30".

Berkeley



Sterling

FOX 15
$6.95



Berkley's "P-47 Thunderbolt."
Kit No. 5-6.
Wingspan 33".
Scale ¾".

Sterling's "Curtis P-40 Tiger Shark."
Kit No. S-7. Wingspan 27½".

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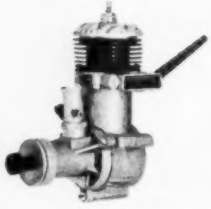

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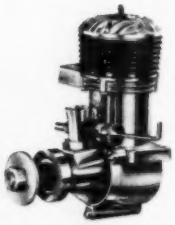

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MODEL
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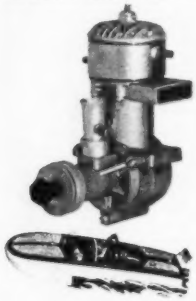
(WATER JACKET)



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Foreign Notes

HUNGARY

► The annual Soviet International event was this year held in Hungary (last year's winners) on June 24-26. The entry was rather smaller than in previous years, with only seven countries (instead of the usual 10-11) competing in three FAI free-flight categories. As in previous years, only one contestant from each country was allowed to compete in each class.

Team results were something of a surprise, with Poland beating Czechoslovakia for first place, Communist China third and the Russians out of the running.

The Wakefield saw the greatest battle, with the Hungarian, Polish, Czechoslovakian and Russian contestants all achieving perfect five flight maximum scores and finishing in that order, after a very close fly-off. Czechoslovakia won the gas event with the only other 15:00 score, followed by China and Hungary, and in A2 it was Russia, Poland and China.

BELGIUM

At the Brussels World Fair, model building, we are happy to note, has not been forgotten. In the Hall of Aeronautics, there is a well presented exhibit by the Federation de la Petite Aviation Belge (Belgium's equivalent to the AMA) in which are shown several fine models. These include two stunt control-liners, four solids, a Wakefield rubber model, a glider and a gas model (these latter three by the well-known Belgian modelers, Maurice Ferber, Marcel Brems and Henri Stouffs). Also shown is the famous eight-channel R/C model of Jean-Pierre Gobeaux, with Ruppert flat-twin Diesel.

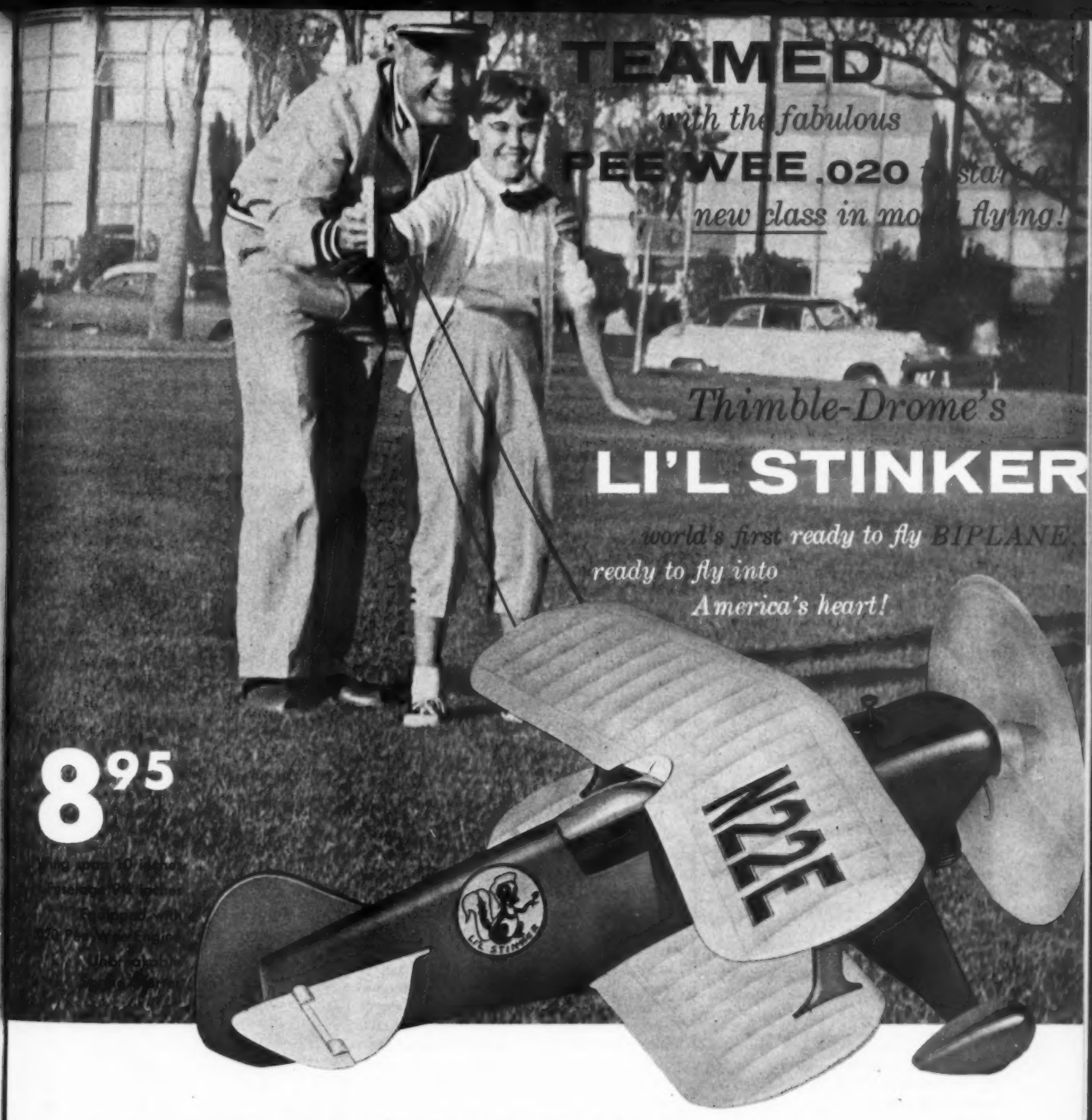
GREAT BRITAIN

In Britain, the control-line event which gets most attention is team racing. Team racing in England started in 1950 with a set of rules (B Class) similar to those originated in America by the FAST Club. Soon, a second and smaller class, for A Class (2.5 c.c.—.15 cu. in.) engines, was introduced and, more recently, a Half-A Class (1.5 c.c.—.091 cu. in.) has been added.

There have always been plenty of 1.5 c.c. motors (virtually all Diesel) in Britain, but this new team racing class lately seems to have stimulated interest among the manufacturers. International Model Aircraft Ltd., makers of Frog engines, have a new 'R' version of their '150' with short-skirted piston and power boosted approximately 25%. Allen-Mercury have a new job called the A-M '15', outwardly identical with the phenomenal A-M '10' and delivering a standard of performance unsurpassed by any current production 1.5 c.c. Diesel.

Now, John Oliver has a new .09 cu. in. Tiger-Cub on the stocks which promises to be, to the 1.5 c.c. class, what the bigger Oliver Tiger is to the 2.5 c.c. class. As yet existing only as a single prototype (which has recently been through our hands for testing) the new Cub will not be available before next year. In general, its design follows that of its bigger brother, with twin ball-bearing mounted shaft and front rotary induction. Four years ago there was an earlier model Cub which also outstripped all its contemporaries, but it was

(*Continued on page* 38)



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29th Year of Publication

MODEL AIRPLANE NEWS

JAY P. CLEVELAND, President and Publisher

OCTOBER 1958 Vol. LIX, No. 4

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Advertising Manager, N. E. Slane, 551 5th Ave. New York 17; West Coast Adv. Mgr., Justin Hannan, 4708 Crenshaw Blvd. Los Angeles 43, Calif.

Published Monthly by Air Age, Inc. Editorial and Business Offices: 551 Fifth Ave., New York 17, N.Y. Jay P. Cleveland, President; Y. P. Johnson, Vice Pres.; Louis V. DeFrancesco, Treas., G. E. DeFrancesco, Sec. Entered as Second Class Matter at the Post Office at Columbia, Missouri.

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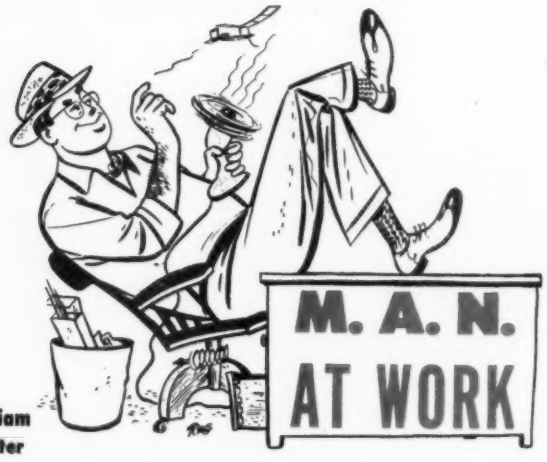

by William Winter

► Certain world areas are strategic cross roads, such as the Middle East, the Polar Regions, and Chicago which, by now, must hold the record for National Model Airplane Contests. Even if Glenview Naval Air Station is well north of the Loop, and the stamping grounds of yore are well to the south, and obliterated by houses, it is Chicago.

Glenview is well out in the boondocks, where free flights and Nordics drift over the corn in 1954, and one does not get to see Chicago at all, unless he's an indoor flier or a sightseer. Life is centered on the Air Station—you can build, eat, sleep, or stay up all night repairing crates, without leaving the place. Things usta be different.

In the great 1940 and 1941 Chicago Nats—this should be read with awe, as in the case of the Great Chicago Fire (no, we didn't see it!)—life was concentrated like nitro in a can of old glow fuel, at the Sherman Hotel. A plaque informed those of wandering attention that this was the site of old Fort Dearborn. In the lobby you could buy those false newspaper headlines, such as Ira Diddleworth Sweeps Indoor Ornithopter, to mail to the loved ones at home. Or you could meet the world's tallest man—MAN at Work came up to his belt buckle—in the elevator, head against the ceiling like a mike job at the Amphitheater in the fragrant stockyard belt. Or the song writer who pedaled a Hammond organ all night on—what floor was that? Or see red-doped signs on floor 11 pointing "Midwest." Or find a line of guys in a corridor waiting a turn to make microfilm in your bath tub, and who picked that lock? A caravan of busses made a third-class round trip daily to the flying field, crammed with guys and crates. Loud were the screams of those left behind.

Hired hands ran about the swank restaurant with flaming sword dinners, as tired, dusty, sunburned disshelved modelers staggered through the lobby. Supper was breakfast and breakfast was—hold that bus!

Chicago, the Sherman, and the AMA hit the jackpot the year the furniture convention also had its headquarters in the Sherman—and over the Fourth of July weekend, if memory serves. Those boys ran on something other than gas and oil. (Leon, you listening?) Evidently overimpressed by the modelers, each with a ribbon pinned to his shirt saying entrant No. 999, one furniture man could stand it no longer. On this hot night he leaned out of an inner window and in a voice that stunned even Mike *(Continued on page 7)*

NEXT MONTH'S COVER Curtiss Seahawk

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PLANE ON THE COVER

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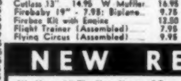

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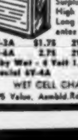

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REG. $19.95 **YOU SAVE A GREAT BIG $10.00** **9.95** AN AHC SUPER BUY

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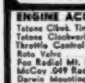

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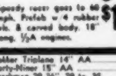

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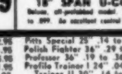

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MAN at Work

(*Continued from page 4*)

"Fog Horn" Thomas cried out, "Will all contestants kindly jump out of their windows in their numerical order. One, two, three . . ." Just then, some anarchist, who had tied a firecracker to a string and lowered it from on high, fired the shot that was heard around the world.

• • •

►Everything was different, and everything was the same. Carl Goldberg, here now, was attending his 13th Nationals. All models were free flight—save for a few holy-cow rc crates, whether rubber, gas or hand powered. Jim Walker was flying some funny thing called a Fireball on the end of two wires. The Buzzard Bombshells, by the dozens, all black (or was it brown) and orange wowed the free flighters. A couple of dozen Struck New Rulers gave them a run. Sailplanes glided like crazy. How could anyone handle the power of that new Ohlsson 60? Radio-car retrieving—what wonders! But you couldn't hear the terrible roar of a Mac 60 at a work hangar door, or see the unending lines of work benches in the hangar, or the thousands of crates on the floor, on the benches, everywhere. It was fun but give us a modern Nationals anytime! It is great just to go to these things, whether to fly, meet old friends, or gawk.

Perhaps this is an opportune time to speak of the eight Hungarian modelers who contacted this column during the Hungarian revolution, probably unknown to each other, but each hoping to come to the U.S. Some of these fellow hobbyists had fought tanks bare handed. After Premier Imre Nagy was put to death, he was described recently as "an enemy of the people." So, of course, the Hungarian modelers who escaped to Austria, were "enemies of the people." Paul Gilliam will report on page 9 of the November issue, we enemies of the people had a heck of a time at the 1958 Chicago Nats.

• • •

► From time to time MAN "plants" a good beginner model which, for years afterwards can be used in club and school programs. One of the most successful was the Swifty, by John Zaic, in the July '56 issue. These little jobs pay big dividends. Ferenstance, the Grout School, Portland, Oregon, held a climatic indoor contest and had several flights of 15 seconds or more. "Not exceptional," said teacher, R. L. Boardwell, "but pretty good for most since they had never built a model before!

"At present we are building hand-launched gliders that weigh about 24 grams. So far flights have been about 27-30 seconds. One small glider climbed out of sight and still hasn't been found."

When this letter was received, the group was planning building Dick Ealy's Feather (Oct. '53 MAN), a tissue-covered, built-up, stick model of the simplest sort.

"I have been working under the assumption that it would be a good experience for the boys to start from scratch," continues Boardwell, "and they love it. Fellows who were considered the biggest problems are now coming around, and it is certainly encouraging."

We all know the value of model airplane building. Perhaps we should say it more often!

• • •

► Dedicated modelers who shun all but serious Wakefield, Nordics, and free flight, should get the Bulletin, by the Montreal Model Flying Club (Barry Haisman, 3244 Goyer Rd., No. 22, Montreal, Can.). Real dope and three-views and top designs.

(*Continued on page 52*)

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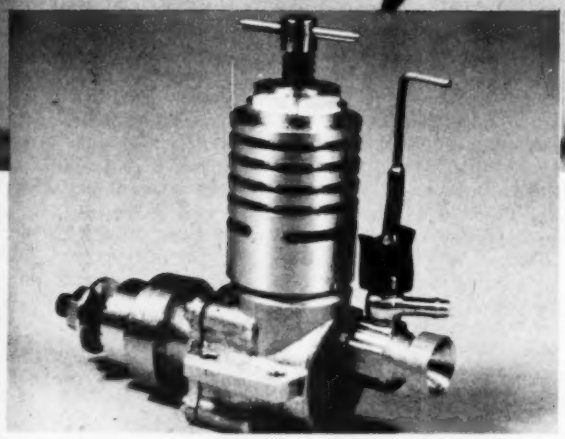
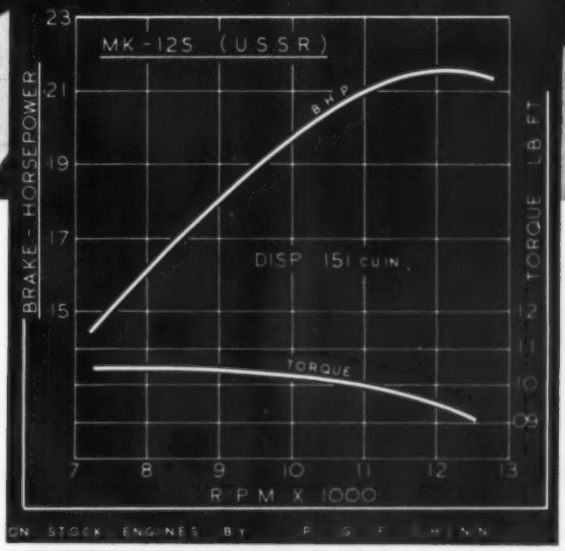
Abramov, Russia, launching MK-12 powered model that took second, European Free-Flight Championships in 1957. Pic by Model Aircraft.



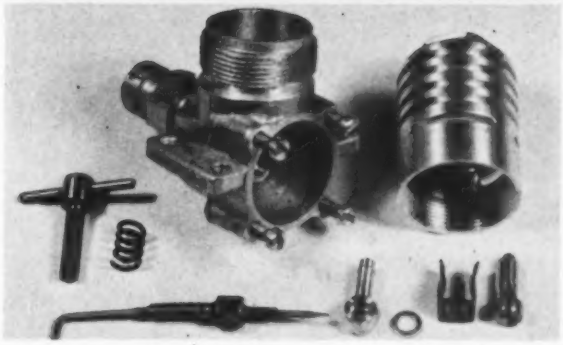
Tested by the author, the Russian MK-12S had a ball-bearing shaft and disc-type intake but was poorly finished. Disc gave trouble.



How good are the "Red" Engines?

by P. G. F. CHINN

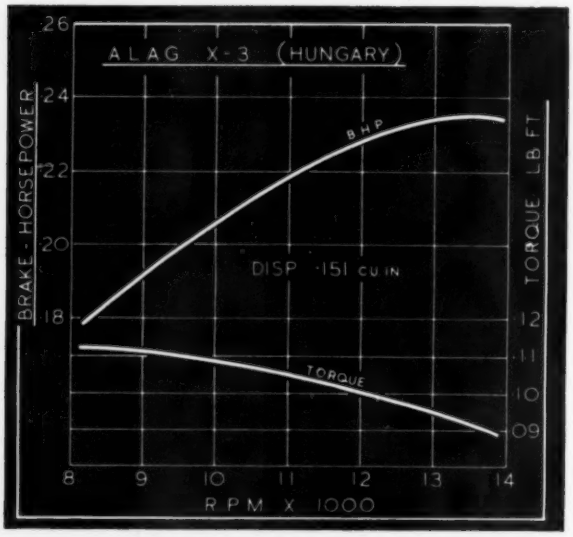
In the past few years, the Iron Curtain countries have made all-out, at times successful, bids for World Championships. Implied is a marked improvement in powerplants. An authoritative report.



Unusual design of needle-valve assembly distinguishes Russian MK-12S. The cylinder barrel screws over crankcase, clamping liner.

The past two years have seen the participation of Russia and the Communist Satellite countries in a number of International and World Championship model events and with increasing success. Previously these countries (specifically, East Germany, Poland, Czechoslovakia, Hungary, Bulgaria, Rumania and Russia and, on one occasion, Red China) had ignored the official FAI international events and had instead, conducted their own "International Championships." The change appears to have been initiated by the success of *(continued on next page)*

Russian expert Michal Vassilchenko releases speed model built by Gajevsky during 1957 World Speed Championships. Model Aircraft.



Hungarian Alag X-3 has a plastic backplate and plastic venturi, but otherwise is typical of European Diesel practice. Is exported.

How Good Are the "Red" Engines? —Continued

the Czech speed team at the World Championships three years ago. There followed impressive Czech, Hungarian and Russian performances in 1956 and last year saw the Russians and their East European neighbors well to the fore with representation in all the important International meets and with wins in both World Championship events.

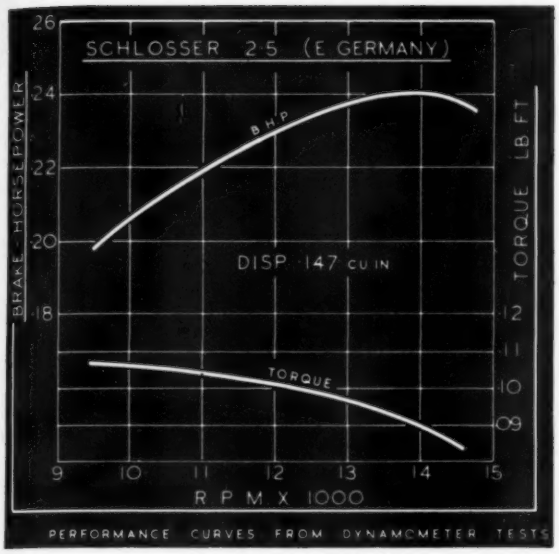
Obviously, the various motors used have played no small part—successful or otherwise—in these activities and it therefore seemed appropriate to review some examples in MAN. With the help of various internationally known modelers we have managed to assemble a representative selection of recent engines from these countries and, following tests, four have been selected for review—one each from Czechoslovakia, East Germany, Hungary and Russia.

The Vltavan-5

Vltavan is a new name in the model engine world. It is the name of a Czechoslovakian state factory specializing in precision engineering work and, during the past year or so, this factory has been turning out what are, in effect, production versions of the MVVS racing glow-plug motors. The connection between MVVS and Vltavan is as follows. The designation MVVS derives from the title of the state sponsored model development center at Brno, which employs a team of seven people on engine research, construction and test programs. MVVS engines are designed and developed to the highest standards of performance and, usually, for some specific purpose, such as the World Championship speed event. In 1956, for example, eight 2.5 c.c (.15 cu. in.) motors were built for the Czech speed team and won for them the team championship. In 1957 four 2.5's of a new type were made, one for each member of the Czech team, and placed 1, 2, 3 and 5 in the World Speed event, well ahead of any Western commercially-built motor. The center does not make engines for sale, however, and to satisfy demands from outside the official teams, the designs of the earlier .15 and .29 MVVS motors were, after the 1955 season, turned over to Vltavan for production. Production is now said to be at the rate of approximately 5,000 units per year.

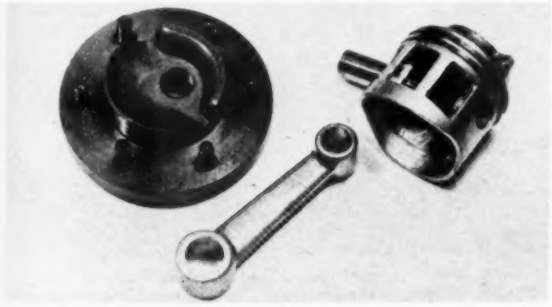
A glance at the Vltavan-5 is enough to show that the engine bears more than a superficial resemblance to the Dooling 29 and this likeness can be traced back through its lineage, namely, the MVVS 5/1954-D engine of 1954 and the earlier Letmo .29 designs. Undoubtedly, Zdenek Husicka and Josef Sladky, who were responsible for these engines, were impressed by both the Dooling 29 and 61. Dooling influence is especially evident in the design of the bypass system—the entire charge transfer being via skirt ports in the piston and cylinder sleeve and a large hemispherical bypass. The Vltavan's appearance, however, is somewhat marred by a rather rough main casting and the

Rugged shaft with small intake and a Webra-type cylinder are featured by the Hungarian-made Alag X-3 engine. Has .15 displacement.

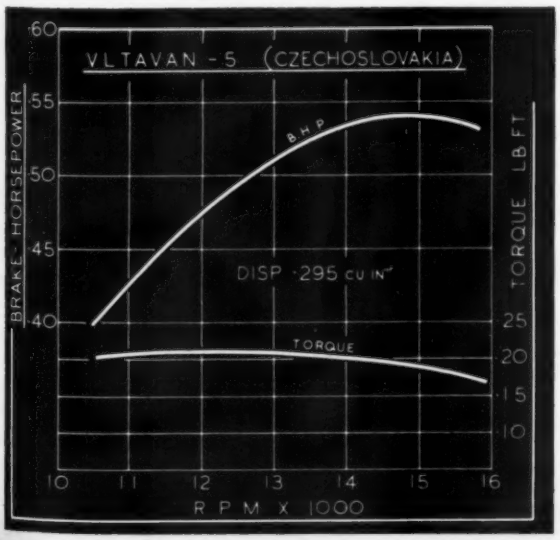


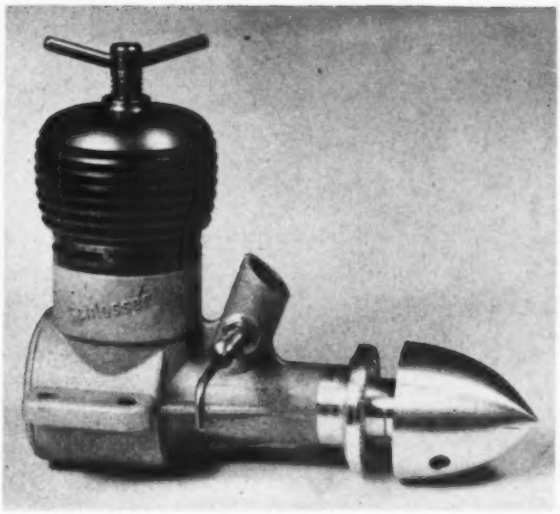
lugs on our test sample were of irregular shape, making it impossible to bed the engine down squarely without first facing up the lug surfaces. We can only assume that this fault, along with one or two other points that spoil an otherwise excellent design, are due to the factory's lack of experience in model engine construction.

By contrast, the execution of the disc-valve induction assembly is among the best we have ever seen. It features a molded plastic rotor, relieved on the rear face opposite the intake segment to assist balance and reduce drag,

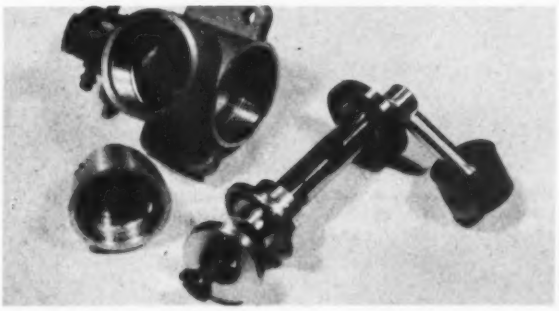


Ultra-light piston and rod assembly and smooth head contours are features of the Vltavan .29. Speed merchants will eye the piston!





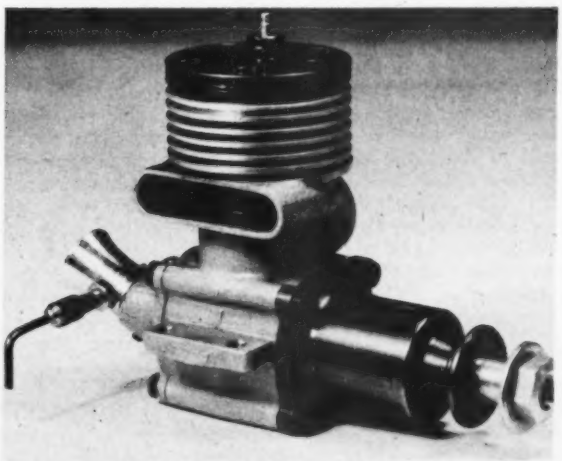
Best finished engine, inside and out, from behind the Iron Curtain is the East German Schlosser. This Diesel also .15 displacement.



Good bearing fits and accurate alignment mark Schlosser construction. Note the unusual hub assembly with a screw-on prop spinner.

mounted on a 4 mm spindle rotating in a long bearing in the backplate and secured with a collar and set screw. The inclined carburetor has a bell-mouthed intake and a very large choke diameter of approximately 21/64-in. and the entry expands smoothly to where the intake port is uncovered by the valve rotor.

Also notable is the piston and rod assembly which breaks all records for 29's by weighing a mere 3/10ths oz. The diecast aluminum piston *(continued on page 54)*



Czechoslovakian Vltavan racing glow-engine .29, production version of a famous MVVS prototype. Design shows marked Dooling influence.

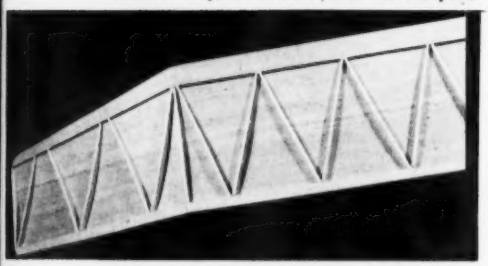
Americano

FAI's rugged, excellent performers, consistent, says Blanchard.

by W. S. BLANCHARD, JR.

Several-times National Champion presents this rugged, fine performer for International .15 power competition.

Neat pylon, timer deal. Like St. Jean (Ramrod), Blanchard says downthrust never hurts anyone.



Diagonal ribs, sheet covering, makes an effective wing which eliminates those pesky warps.

Weighing about 26 ounces for its .15, Woody's original will batter three minutes on 15 secs.

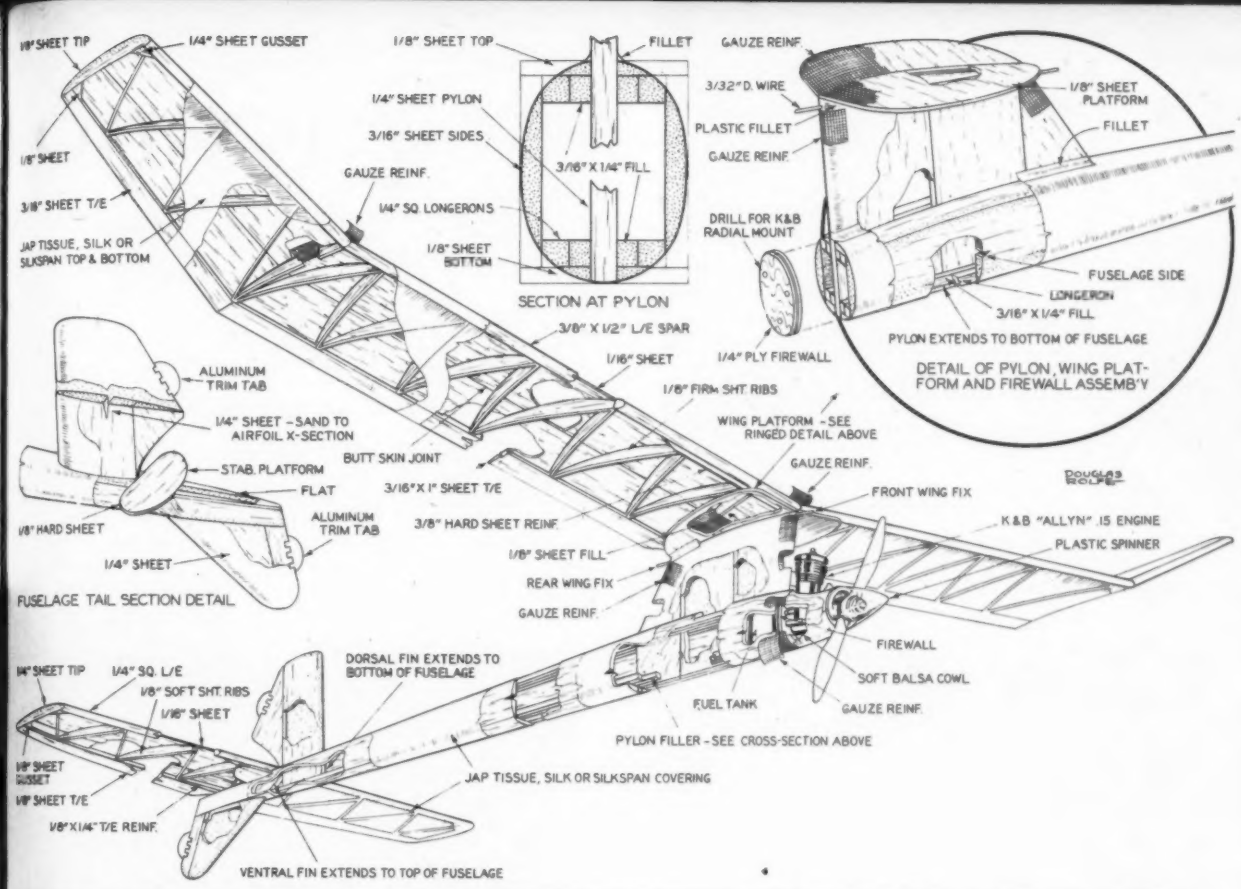
Both power and glide flight to the right, using stabilizer tilt, top-and-bottom-tabs trim.

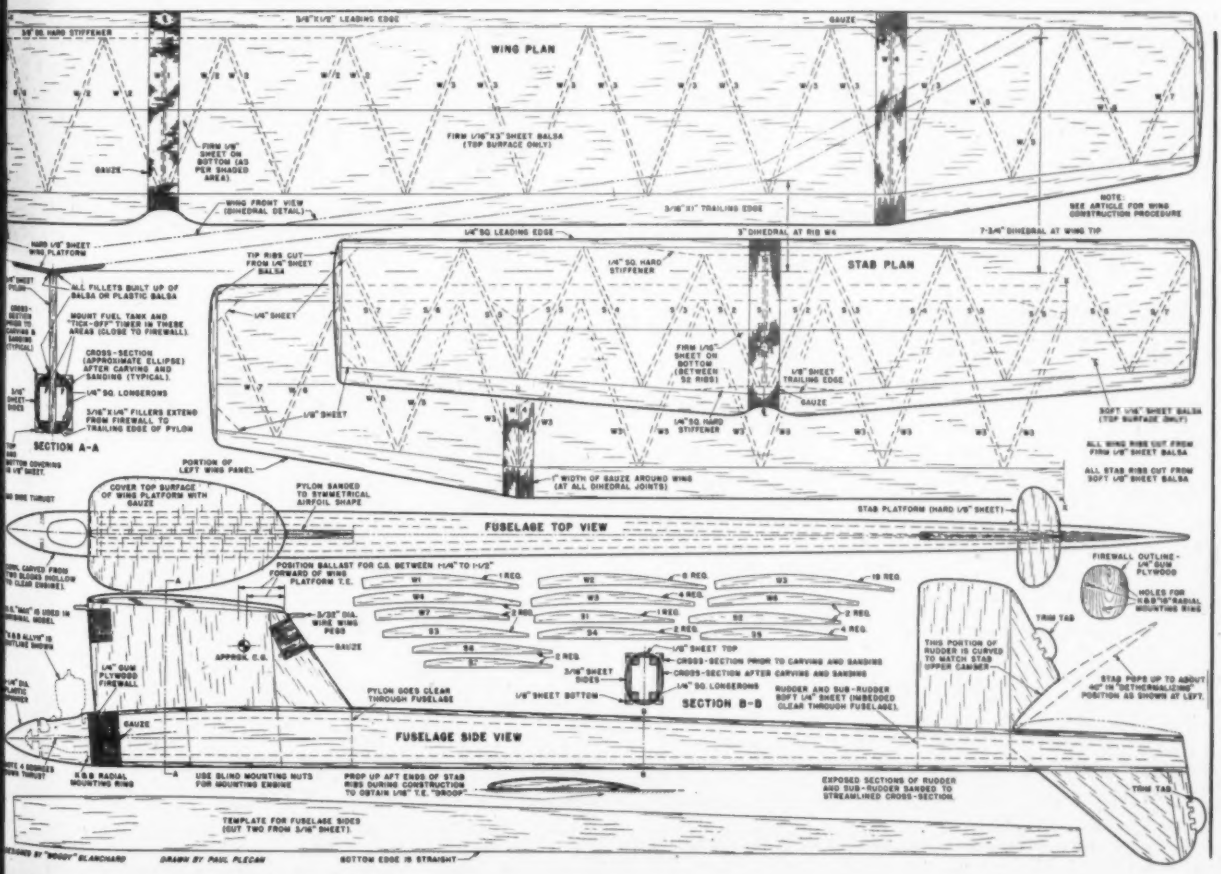
► "Americano" has been designed for for the 1958 FAI power rules. For an engine of .15 cubic inches displacement, these rules require a minimum all-up weight of about 26 ounces. The required wing-loading allows a maximum total projected area (wing-plus-tail) of about 580 square inches for a model weighing 26 ounces. This makes for a very rugged airplane with a respectable life expectancy and, contrary to the predictions of the "don't-raise-the-power-loading" boys, these rules have resulted in airplanes that not only have excellent performance, but are far more consistent than their more powerful brothers. It is the opinion of the author that AMA should take note of this when drafting our next set of rules. After all, how can we expect to attract many new youngsters to our hobby when they see a large percentage of all free-flight gas models smashed, as a result of excessive power, at most any contest? An increase in the AMA power-loading would penalize all of us equally, and would result in a sharp decrease in the number of smashed airplanes in the hands of less-experienced fliers (and experts, too!).

Americano utilizes a new type of wing structure that the author has found to be suitable for most any class of free-flight model. It is believed that anyone who tries it will be pleased with the results. The method allows rapid construction, yet yields a wing that is very rugged, and retains shape well. Fuselage construction is a steal from Lindner's Nordic of a couple of years ago, is as rapid as any method known to the author, and yields a stronger, cleaner fuselage than most other methods.

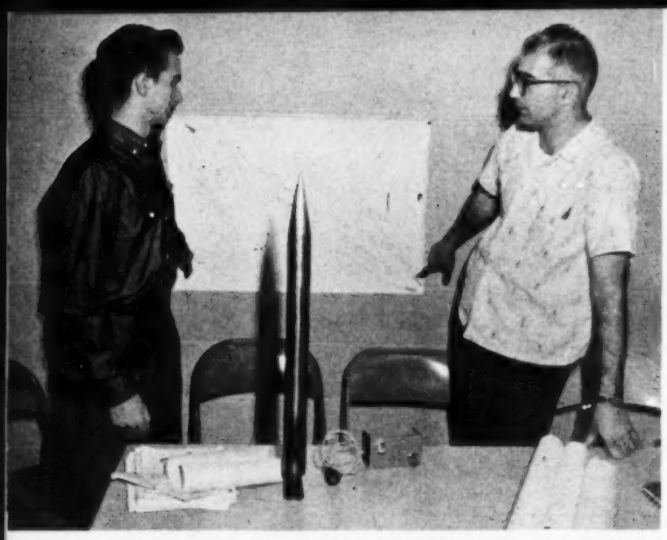
Begin wing construction by joining two sheets of firm 1/16 x 3 x 36 balsa edge-to-edge. Use a metal straight-edge to true up the edges before joining. Still using the straight edge as a guide, cut the sheet balsa to outline shape for one wing panel (root to tip). Use the wing drawing as a template, but cut the chord 3/32 in. oversize, root to tip (this corrects for fore-shortening due to airfoil curvature). Next, pin the sheet to a flat surface, and butt-join the leading and trailing edges to the sheet. Install the 3/8 x 3/8 hard balsa stiffener at the inboard leading edge.

Apply two coats of nitrate dope to the face-up side of the sheet balsa, and remove the pins (primary purpose of the dope is to prevent "sagging" of the sheet balsa between ribs after the completed wing is covered and doped). Using pins, cement in every other diagonal wing rib. This can be done holding the wing in the hands, taking no special care (*continued on page* 50)

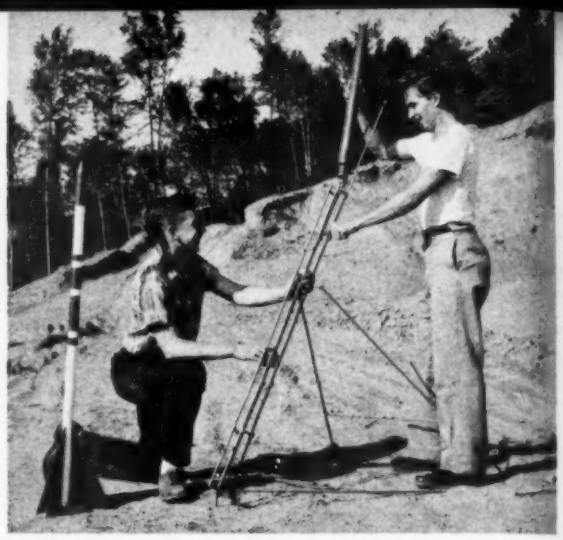




FULL SIZE PLANS AVAILABLE. SEE PAGE 60



Fifty rocket firings—20 of them successful, is the record of Ray Feeders, 16, left; discussing rocket with John Gutman, Director.



Feeders places rocket (see picture at left) on rail launcher, as Tim Brady, 14, left, lends hand. Launcher length, angle, vital.

When rocket fails to go off, time is allowed before approaching the "pad." Rocket Club Director makes sure no one absent minded.

After safe interval, igniter wire is removed. Rocketeers vary number of loops in wire, retest with small quantity powder in open.

Rocket again ready for blast-off, as "crew" retreat to shelter of sand banks. Careful procedure, prescribed routine, no chances.

Three, two, one—and away she goes. MAN's photog did not see the rocket itself as it streaked hundreds of feet high. Good "shoot."

Director Gutman, glasses, standing, and Harry Brady, assistant director, standing, right, conduct discussion in Youth Center Building.

Father and son, Tim and Harry Brady load their rocket in Volkswagen belonging to the Recreation Department. Well supplied group.

Count-Down .. Fairlawn, N.J.

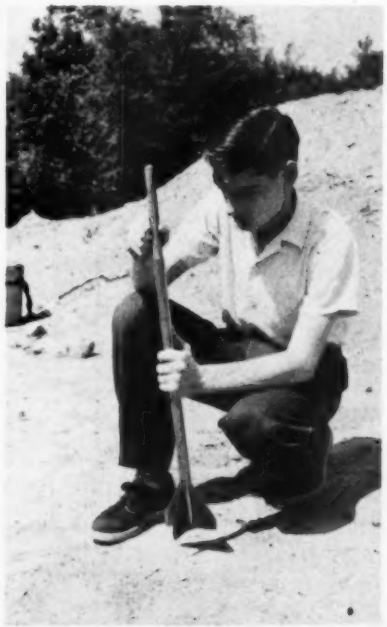
PICTURES BY RUDY ARNOLD

► In the August issue, MAN impartially examined the question "How Safe Are Rockets." It is time now to report one of the safer and saner operations, that of the Amateur Rocket Club, in Fairlawn, N.J.

This successful and highly active club had its beginning when reports of individual experiments at home, caused the town fathers to decide that the way to encourage scientific work among its youth, was to bring the "thing" into the open. Having obtained appropriate insurance, Fairlawn, through its Recreation Department, gained the use of an outlying sandpit, subject to rigid operating conditions. No crowds and no fanfare.

PICTURES CONTINUED ON FOLLOWING PAGE

After zinc, sulphur have been mixed at site —never anywhere else—John McGowan, 15, pours the mixture through funnel into rocket.



Tamping powder into rocket, John uses wood plunger that matches inside diameter of rocket tube. He has expert supervision, advice.

Fine wire igniter "firing pin" is inserted. Rocket design, fuels, ignition, all exacting sciences—"lone wolf" activity a menace. Rocket no toy.

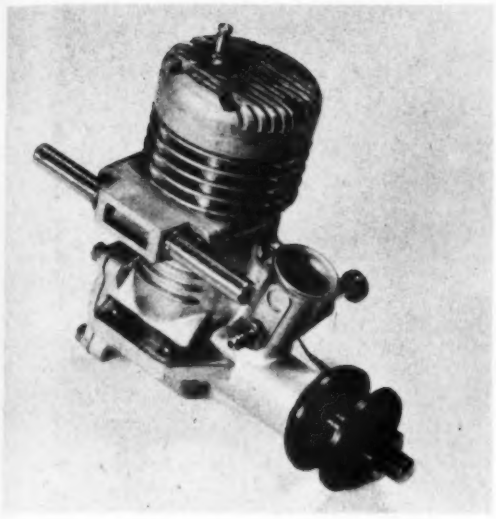
Demonstrating dual firing key are the Brady's. One key cannot fire rocket unless other depressed—accidental launch eliminated.

Using scale left, Dave Engle, 15, and Roger Bolt, 12, and Tom McGowan, right, try their hand at weighing ingredients. Mixed later.

COUNT DOWN . . Continued

John Gutman carefully checks work at rear of truck that carries all the equipment and portable electric generator used in firing.

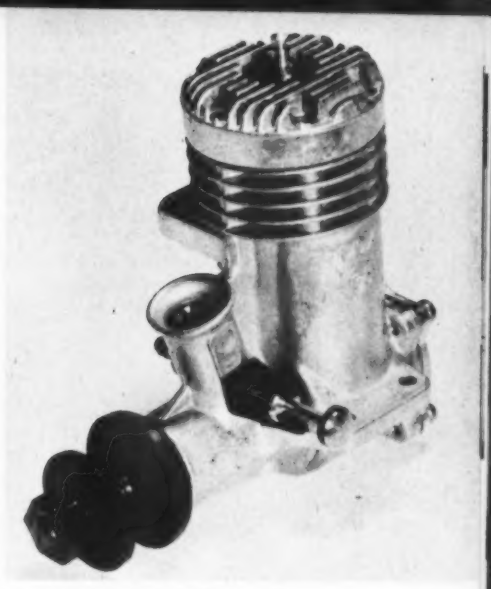
At rural sand pit, Gutman mixes the ingredients that make up the rocket fuel. Rockets are homemade but are brought to "shoots."



by E. C. MARTIN

Engine Review

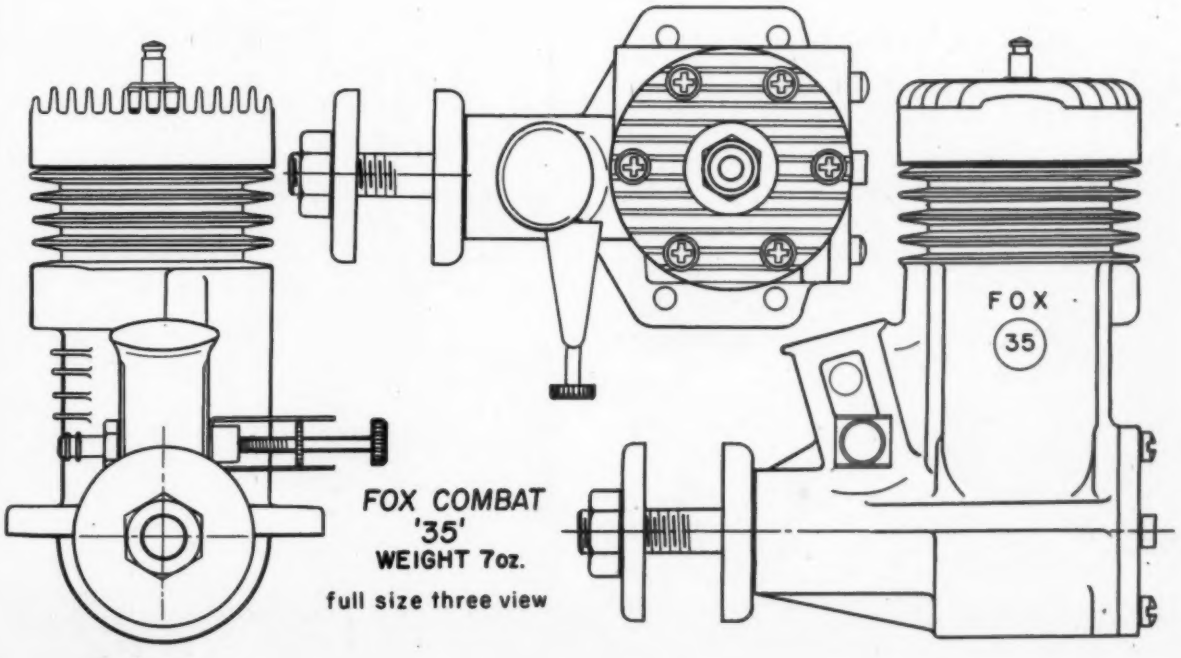
Fox. 35



R. C. SPECIAL ◄ ► COMBAT SPECIAL

► With the Fox .35 firmly established in stunt, and the 29R in speed circles, two new special purpose engines have appeared under the Fox banner. Basically the two engines are very similar and embody several notable refinements which will doubtlessly find their way into the other engines in the range. Of greatest interest, however, are the ways in which the design is adapted to the very different requirements of radio control use on the one hand, and the sustained hammering of combat flying on the other.

Taking the two engines piece by piece let us see what does which and why. The main casting is exactly the same for both engines except for two tapped holes in the exhaust stack for the exhaust throttle attachment, and two lubrication grooves in the main bearing on the RC version. A radio engine usually runs for long periods and with fine pitch props can attain quite phenomenal revs in long dives. The combat engine never has the load removed by long dives and, therefore, does not reach such high revs. The use of grooves in the radio engine suggest that light-load high revs cause more of a bearing problem than normal load normal revs. This makes more sense when it is realized that much of the bearing load is not caused by combustion pressure but by the effort of overcoming the inertia of the piston in the course of stopping its travel and getting it moving in the opposite direction. At T.D.C. this load is opposed, and therefore effectively reduced, by combustion pressure. However, when (*Continued on page* 47)



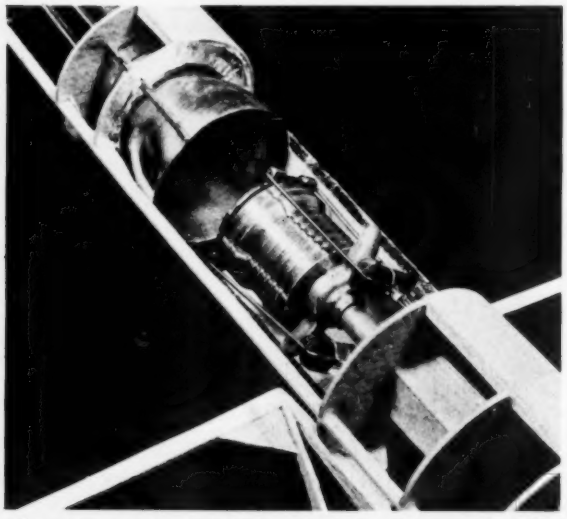
Like an arrow, the model Bomarc zips from the designer's hand. With three power units, thrust actually exceeds the gross weight.

Bomarc

► We lit the fuse and waited tensely for the power to build up in the Jetex Scorpion "600". One, two, three seconds passed, before she really started to put out, and then we launched the Bomarc. It took off skyward at 45 degrees, nosing up even steeper as speed increased. One hundred feet, 200, perhaps, 250 feet high! Then the power cut off.

by PAUL E. DEL GATTO

Pushed by the powerful Jetex Scorpion —you can use three engines—this scale anti-aircraft missile travels like scared rabbit. It flies several hundred yards.



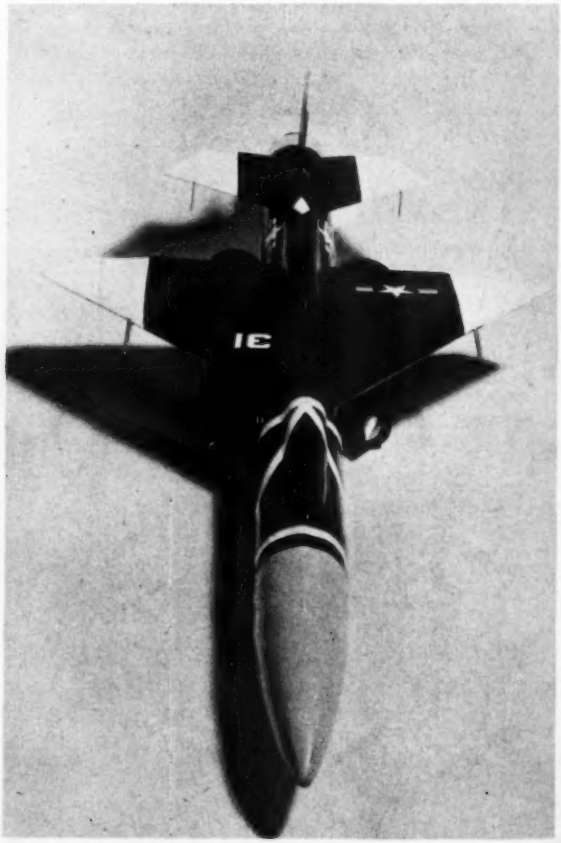
Above—Snug fit is the Scorpion installation. Note mouth of the augmenter tube—it boosts thrust considerably—toward the left.

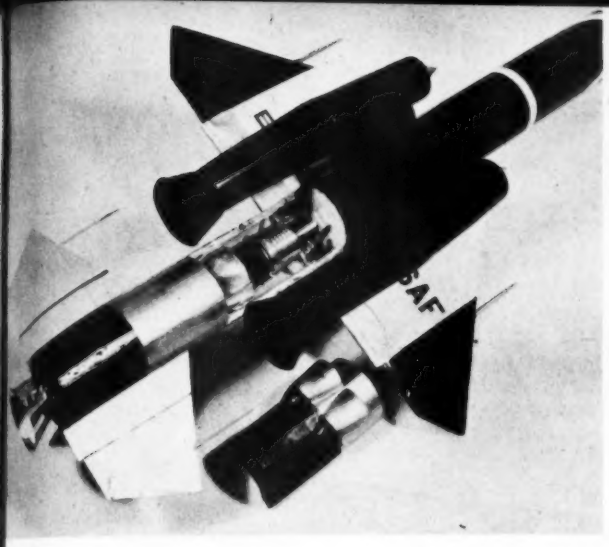
Right—Businesslike Bomarc, like other winged missiles, flies like a plane with high wing loading. Can be adjusted quite easily.

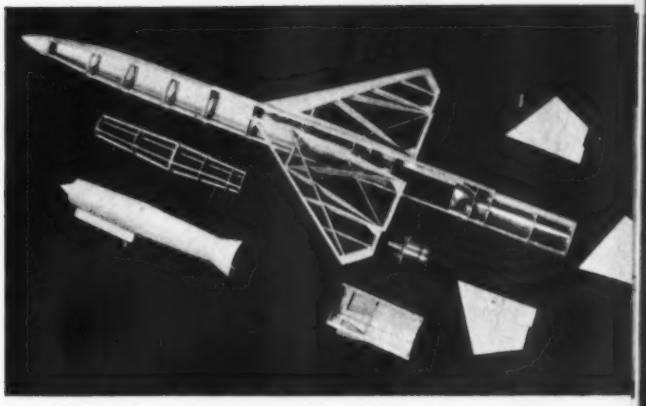
The Bomarc started a wide turn as she began to glide in, quite fast, but surprisingly flat for a model of such proportions. It finally nestled down in some tall grass several hundred yards from the launching point. This was to be the first of many successful flights. Most were far more spectacular!

On these first test flights we were still using the old Jetex fuel. When we changed over to the "V-MAX" fuel, performance was boosted another 25%. These spectacular results more than justified our faith in such a project.

The events which led up to the design of the model







Left—Underneath view with motor hatch removed. Easy to make, the miniature Bomarc nevertheless offers plenty of interesting details. Compare the construction shot with that of the finished machine.

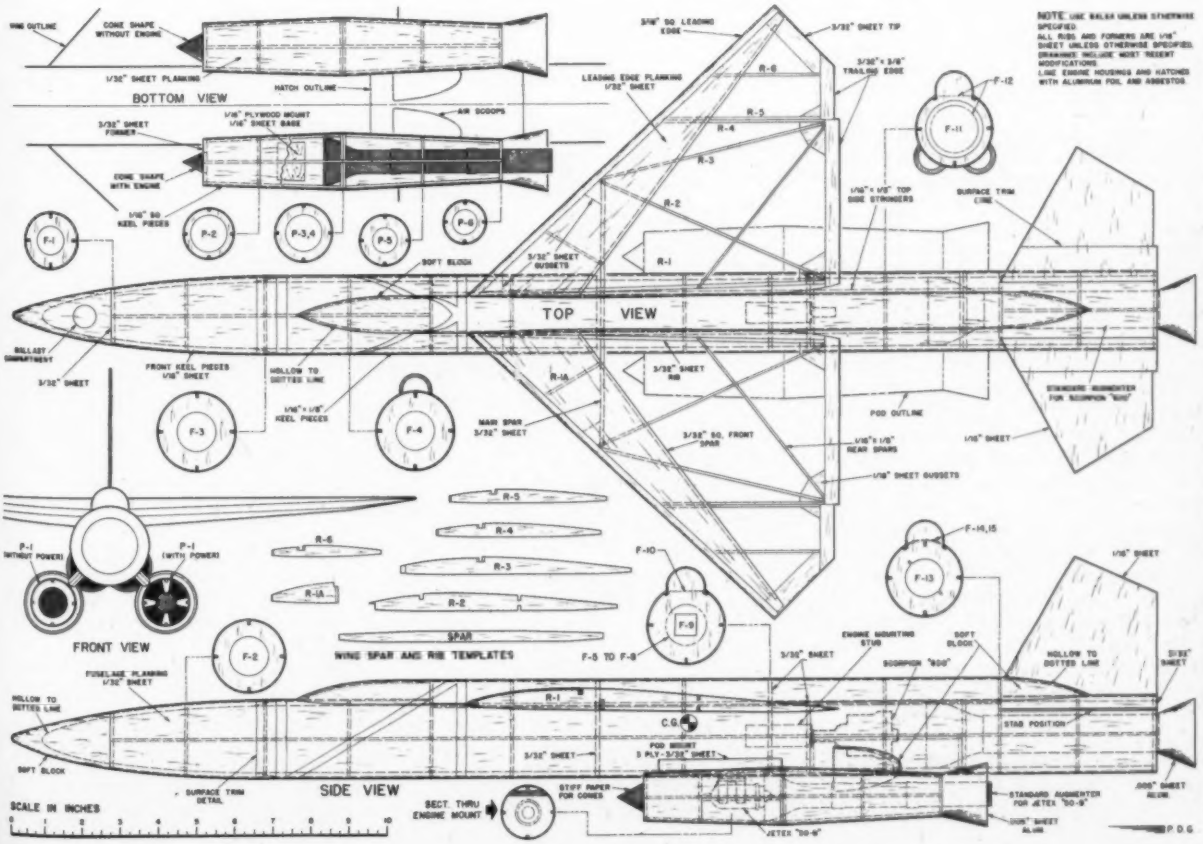
Bomarc are worth noting, because they involve all considerations in designing Jetex-powered missiles. To begin with, while the Bomarc is a missile-type aircraft, it has many of the desired characteristics of a conventional aircraft, and has wings and tail surfaces.

Its slim functional fuselage and pod configuration affords maximum streamlining and permits an easily designed light-weight structure. The generous sweepback in the flying surfaces, eliminates the need for any dihedral, thus allowing close adherence to scale.

The one major change made, was to enlarge the flying surfaces slightly with respect to the fuselage and pods. The increased area, made it possible for us to design a well-stressed, streamlined structure with a wing loading well under the critical maximum for a safe gliding descent.

Two models were made; the second featured structural and aerodynamic refinements. The plans include still further refinements, and give detail on using the pods to house two more smaller engines, the size of the Jetex "50B". The proportions of the pod are ideal to take these engines, in addition to the standard Augmenter tube for the "50B".

The addition of these engines and augmenter tubes will raise the average weight of (*Continued on page* 36)


BOTTOM VIEW
TOP VIEW
FRONT VIEW
SIDE VIEW
WING SPAR AND RIB TEMPLATES
SCALE IN INCHES
NOTE: USE BALSA UNLESS OTHERWISE SPECIFIED.
ALL RIBS AND FORMERS ARE 1/16" SHEET UNLESS OTHERWISE SPECIFIED.
DRAWINGS INCLUDE MOST RECENT MODIFICATIONS.
LINE ENGINE HOUSINGS AND HATCHES WITH ALUMINUM FOIL AND ASBESTOS.

FULL SIZE PLANS AVAILABLE. SEE PAGE 60

Early Birds

by DOUGLAS ROLFE

Number 2

THE FIRST MONOPLANES

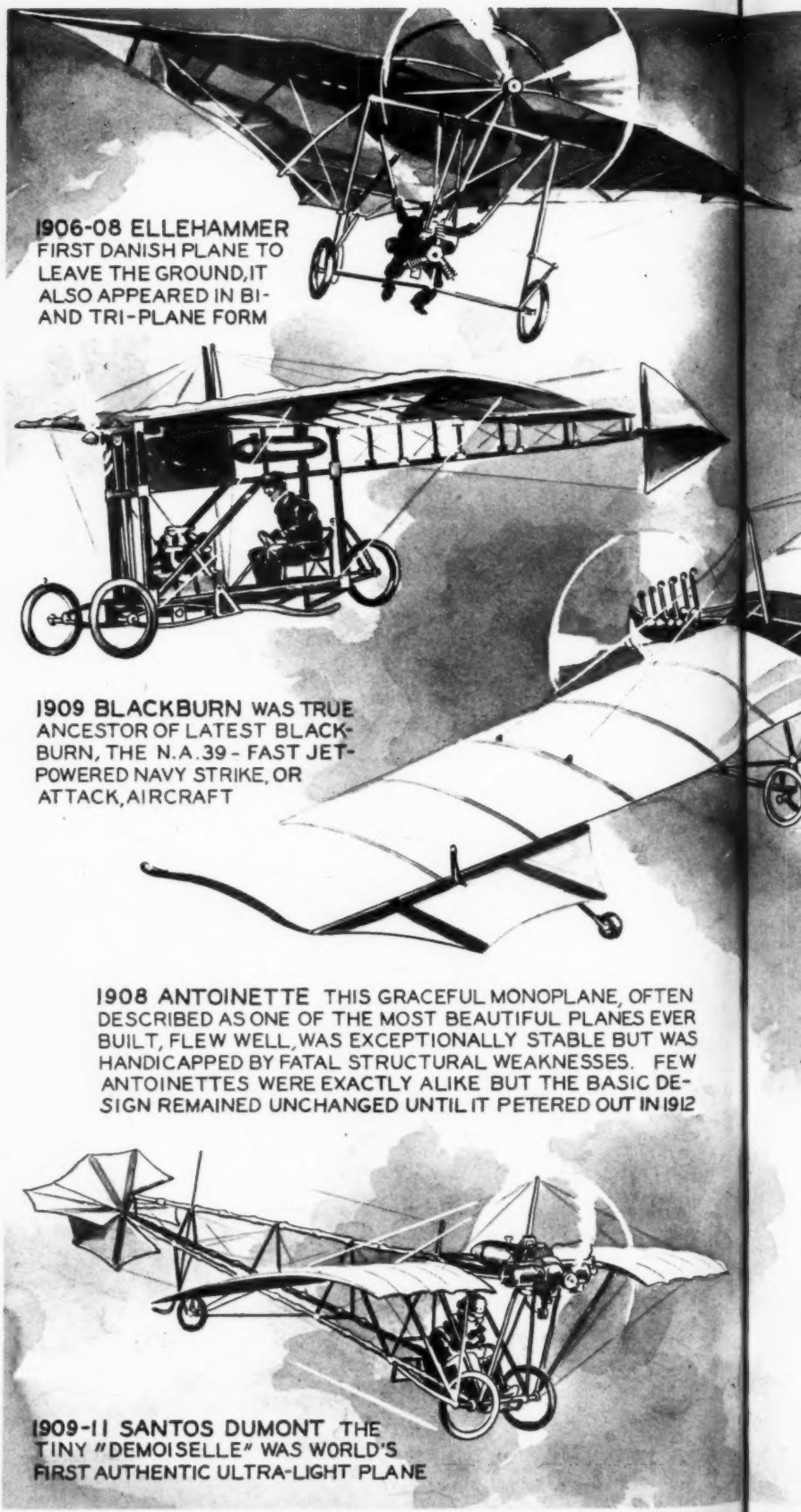
► The Wright brothers' successful flights electrified the entire civilized world and, in France, stirred up an immense interest and activity.

Consider the little R.E.P. monoplane. Fifty years ago its designer was thinking in terms of self-braced cantilever wings, steel tube construction, tandem-wheel landing gears, fan-type radial air-cooled engines and had already contributed the stick control system to posterity! Or Bleriot! He had already produced shoulder-wing and low-wing types before turning out the machine illustrated which was notable for the wing-tip ailerons.

The early Antoinette landing gear is basically the same found on certain big jet bombers today, while the skin-type fuselage radiators are evidence of advanced thinking in these early days. One year after their first design the Nieuport brothers, Charles and Edouard, were producing their clean little racing monoplanes which in a similar horsepower class would compete favorably with modern aircraft.

The Ellehammer Monoplane was soon converted into a triplane and, later, a biplane. It was first airplane to be powered with a radial air-cooled engine, designed and built by Ellehammer. (First radial engine by Manley for the Langley "Aerodrome" was liquid-cooled.)

The Santos-Dumont "Demoiselle" was often subject to ridicule and was known as "The Infuriated Grasshopper." It performed well and at one time held the world's altitude record.

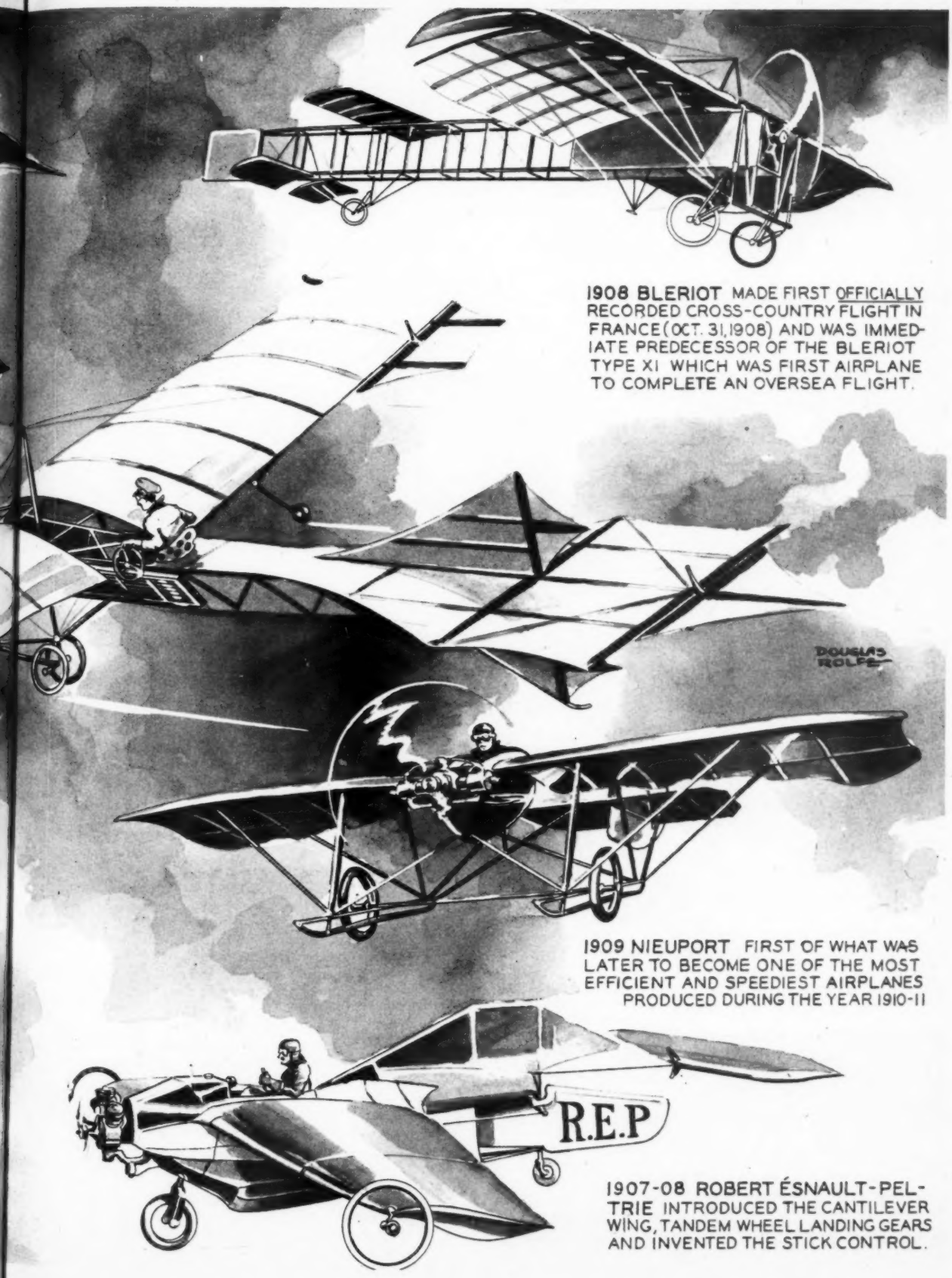


1906-08 ELLEHAMMER FIRST DANISH PLANE TO LEAVE THE GROUND, IT ALSO APPEARED IN BI- AND TRI-PLANE FORM

1909 BLACKBURN WAS TRUE ANCESTOR OF LATEST BLACKBURN, THE N.A.39 - FAST JET-POWERED NAVY STRIKE, OR ATTACK, AIRCRAFT

1908 ANTOINETTE THIS GRACEFUL MONOPLANE, OFTEN DESCRIBED AS ONE OF THE MOST BEAUTIFUL PLANES EVER BUILT, FLEW WELL, WAS EXCEPTIONALLY STABLE BUT WAS HANDICAPPED BY FATAL STRUCTURAL WEAKNESSES. FEW ANTOINETTES WERE EXACTLY ALIKE BUT THE BASIC DESIGN REMAINED UNCHANGED UNTIL IT PETERED OUT IN 1912

1909-11 SANTOS DUMONT THE TINY "DEMOISELLE" WAS WORLD'S FIRST AUTHENTIC ULTRA-LIGHT PLANE



1908 BLERIOT MADE FIRST OFFICIALLY RECORDED CROSS-COUNTRY FLIGHT IN FRANCE (OCT. 31, 1908) AND WAS IMMEDIATE PREDECESSOR OF THE BLERIOT TYPE XI WHICH WAS FIRST AIRPLANE TO COMPLETE AN OVERSEA FLIGHT.

1909 NIEUPORT FIRST OF WHAT WAS LATER TO BECOME ONE OF THE MOST EFFICIENT AND SPEEDIEST AIRPLANES PRODUCED DURING THE YEAR 1910-11

1907-08 ROBERT ÉSNAULT-PELTRIE INTRODUCED THE CANTILEVER WING, TANDEM WHEEL LANDING GEARS AND INVENTED THE STICK CONTROL.

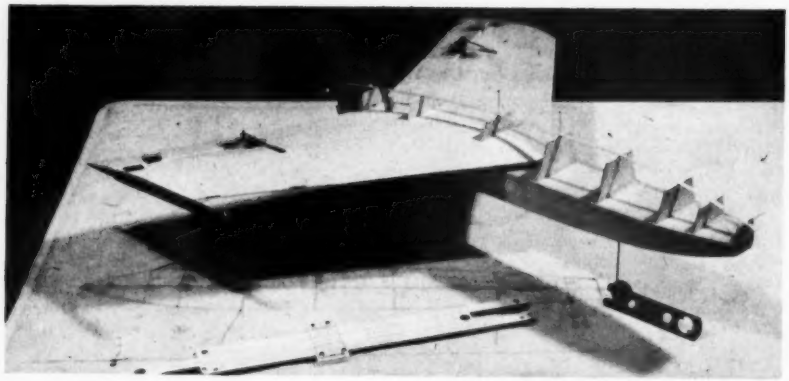
"CUTLASS"

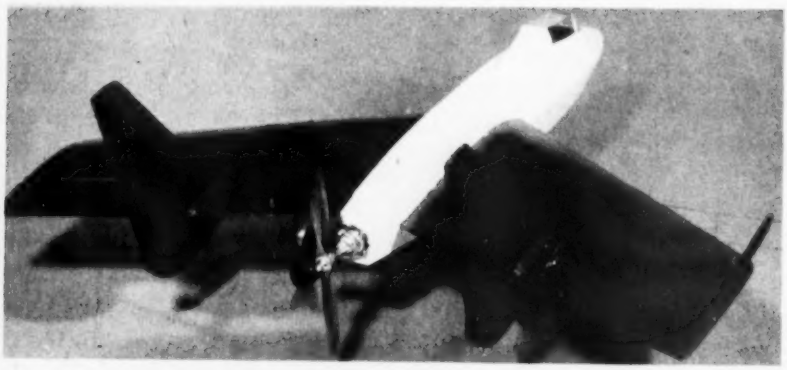
by JOHN BERRYMAN

For sport flying on Half A engines, Cutlass-type model is a refreshing experience in table-top construction.

Despite an off-the-beaten-track appearance the half-pint "Cutlass" is stable, and will loop.

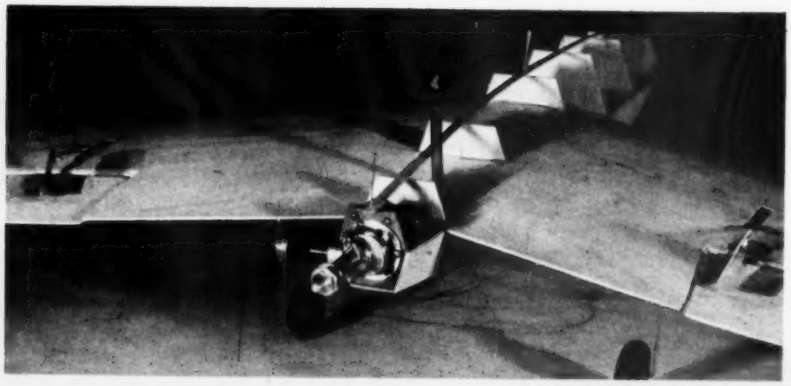
Below—For quickie sport flying, streamlined fuselage modified to use six sheet-balsa sides.





Weighing nine ounces for its 150 square inches of wing, author's Cox job zips on 40-foot lines.

Below—After bottom half of fuselage and wing are finished and joined, top of fuselage built.



► The radical planforms of many recent fighters make them hard subjects for flying scale. Here's a Half-A propeller version of the unorthodox Chance-Vought Cutlass Navy fighter that's as sharp as its name. This near-scale beauty is outstandingly stable and delightfully easy to fly.

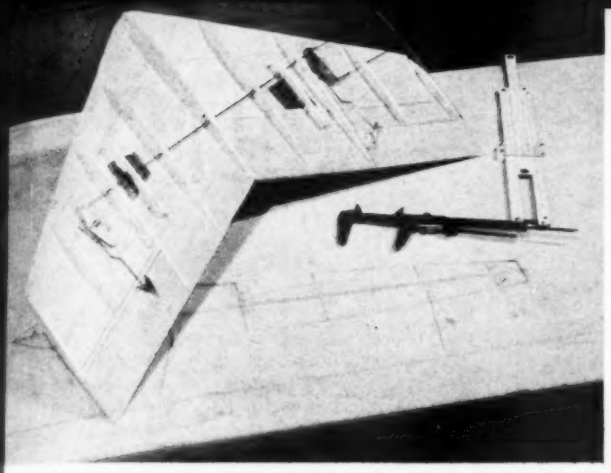
Changes from scale have been made to keep weight down. Wing location has been moved aft a trifle; the round fuselage has been rendered as a smooth six-sider; the jet intakes have been omitted for weight reasons (but you may easily add them if you wish); and the after-burner is made optional.

The full-scale Cutlass, powered by twin jets, has engine weight concentrated toward the rear. To get proper balance for our near-scale prop version, we located the engine aft, in pusher position. This makes the Cox Thermal Hopper .049 convenient to use. The reed-valve Cox engines run equally well in either clockwise or counter-clockwise rotation without special parts. This lets you use your Cox as a pusher without carving special props.

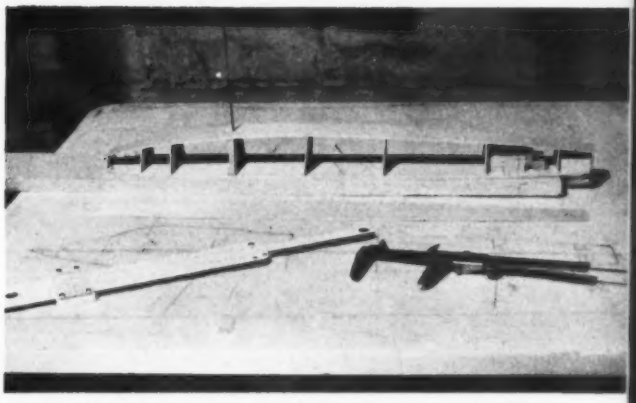
A number of other manufacturers will sell you special crankshafts for "left-hand" operation of their Half-A shaft-valve engines, notably Allyn, Atwood, Holland and K & B. Left-hand shafts cannot be secured for OK engines, the manufacturer informs us.

The Cutlass is a flying wing and as such is extremely clean and efficient. The plans here are for an all-balsa job of 150 square inches, which may seem like a lot of sail for Half-A. Your sharp Cutlass will check in at a husky nine ounces. The surprising power of your Cox .049, however, will give you all the speed you want on 40-foot Orlon lines, and your sharp Cutlass has enough sail for loops and wingovers.

To keep within the nine-ounce weight allowance, though, you'll have to use care in selecting your balsa stock. Working with laboratory scales, we've found that 50% differences in



Control surfaces are built integrally with wing and controls are installed; after wing is finished, control surfaces are cut free.



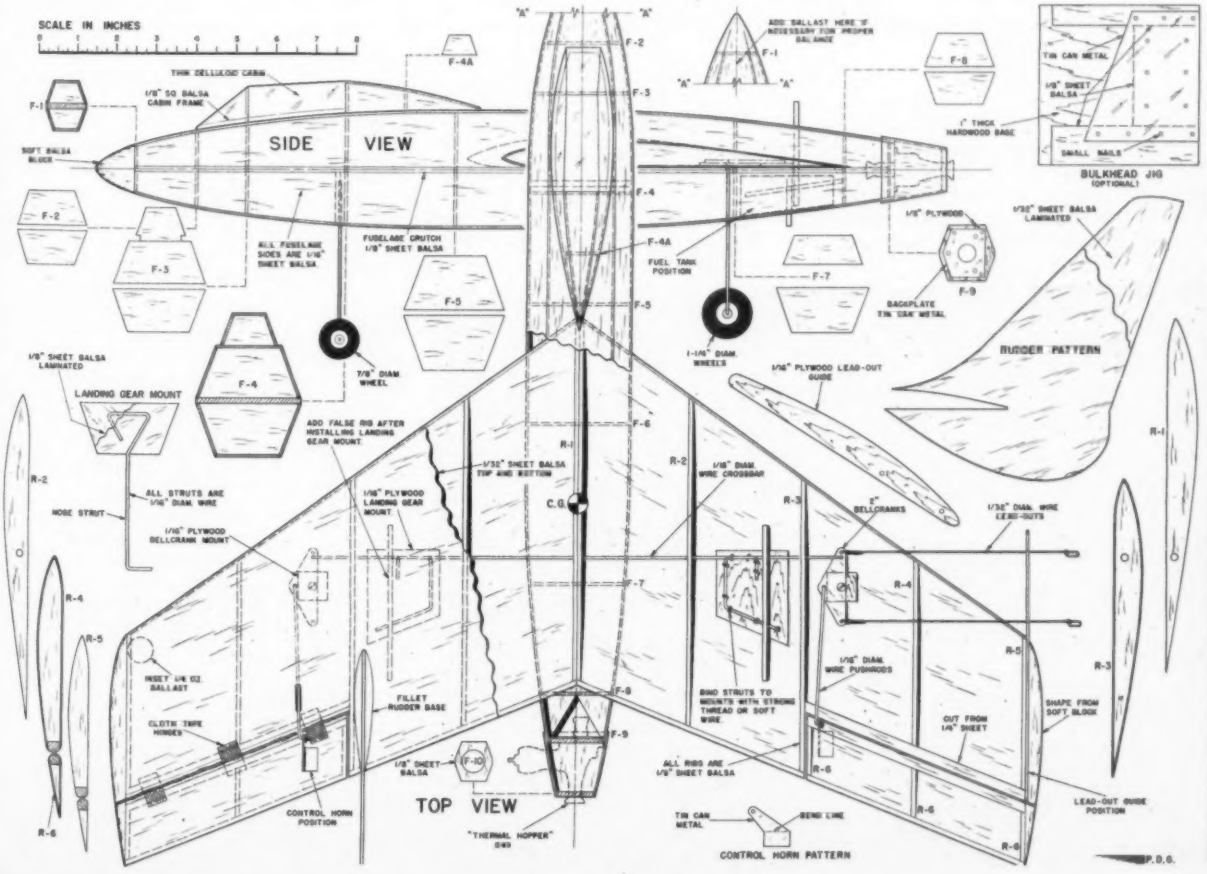
Bottom half of fuselage is assembled on its ½ thick crutch, pinning crutch to ½ thick wood. Jig (see plan) makes for good bulkhead fits.

weight are not at all uncommon in given sizes of the same grade of sheet balsa. Throughout in building your sharp Cutlass, pick the softest and lightest balsa in each size that you can find.

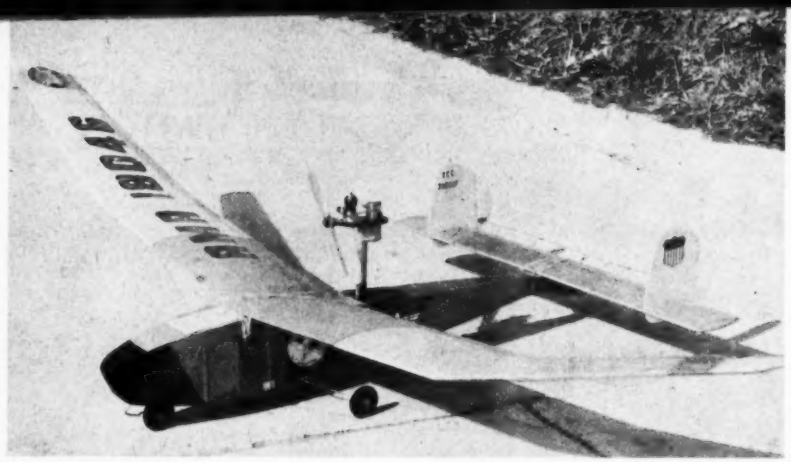
We use two construction ideas that you may not have run into before, and you should understand both before starting. Compound curves are strictly for the birds when it comes to handling sheet balsa. We've rigged up a simple way to avoid them, while giving plenty of realism to fuselage construction. All fuselage bulkheads are cut on a jig that provides identical angles to all bulkheads. Don't try this job without jig-cut bulkheads—you can't hand-cut them accurately enough. If you try to hand-cut the bulkheads, you'll get a weak and sloppy fuselage.

Secondly, it is essential that the two separately operated control surfaces track exactly together and that the whole control system be "square." The only easy way to get the desired degree of symmetry is to build the control surfaces integrally with the wing, install all controls, and late in the construction cut the control surfaces apart from the wing proper. The construction notes follow that scheme.

Start by building the bulkhead jig. Cut a piece of tin-can stock to the dimensions shown and mount atop strips of 1/8" balsa to a piece of plank with small nails. From 1/16" sheet, cut the balsa rectangles in sizes as shown on plans (*continued on page* 41)



FULL SIZE PLANS AVAILABLE. SEE PAGE 60



Ten-year old Jasco Floater glider conversion by Bill Northrop, Jr., uses SM-1 receiver, Bonner escapement and, despite 6-foot span and 34 oz. weight, flies on Mac .049 Diesel—you see it?

Radio Control News

by EDWARD J. LORENZ

Quarter-A flitters and ten-channel trucks, what trends! Latest gismos and gimmicks.

TECHNICAL TOPICS

► First off this month we'll discuss, again, the trials and tribulations of some of the circuitry presented in this column. As stated before, circuits which appear in the column are not generally construction articles. They are presented to show what the various builders have done and what can be done in the way of new circuitry. The modulator presented by Mr. K. Day of Poughkeepsie, N. Y., in the April '58 issue of MAN is a good example. A number of these units were built, tested and found to work as described before it was presented.

A subsequent correction was made concerning the plate/screen connection of the last stage. A number of inquiries have been received saying that the unit does not function as described. It is difficult to truly analyze the trouble from description alone. However, several of the units were made operatable by rewiring the unit in a neater manner and by resoldering all of the joints (probable cold solder joints). In any event, we can truthfully say the unit will work as described and is claimed by Mr. Pearce, designer of the transistorized reed receiver, to have phenomenal stability with regard to changes in battery voltage.

It should be noted, that this modulator does not produce a sine wave, but rather a modified square wave and that reeds do not require a sine wave to operate them. A square wave contains harmonics, hence will show as a "broader" tone to a respective reed. It is this characteristic that would make this unit doubtful as far as simultaneous operation is concerned. It was designed to grid modulate our MOPA transmitter and as a companion to the Pearce receiver. While construction of the modulator is not really critical, care must be taken in laying it out and in making the wiring neat and lead connections short. In view of this, we will present a printed-wiring panel for this unit by the end of the year, in time for you to build and use it in the spring.

• • •

Another example to amplify one of the above statements on diagnosis, concerned a transmitter which we were asked to fix. This was a Mac 1S4 unit converted to a 3A4. Operation for the past five years had been perfect. Suddenly, the plate current shot up to full scale, from 20 to 50ma. Suggestions were that the tube was bad or the crystal had gone bad, both of which could be possibilities. Upon checking it, it was found that the plate current actually slammed the needle to full scale and beyond, such as would occur when placing the meter directly across the 135v supply. When this occurred, we were able to spot the trouble immediately as a shorted plate by-pass capacitor. The particular component, a molded mica, had shorted out after five years of use. This instance indicates the difficulty in exactly diagnosing the trouble when a visual inspection is not made.

• • •

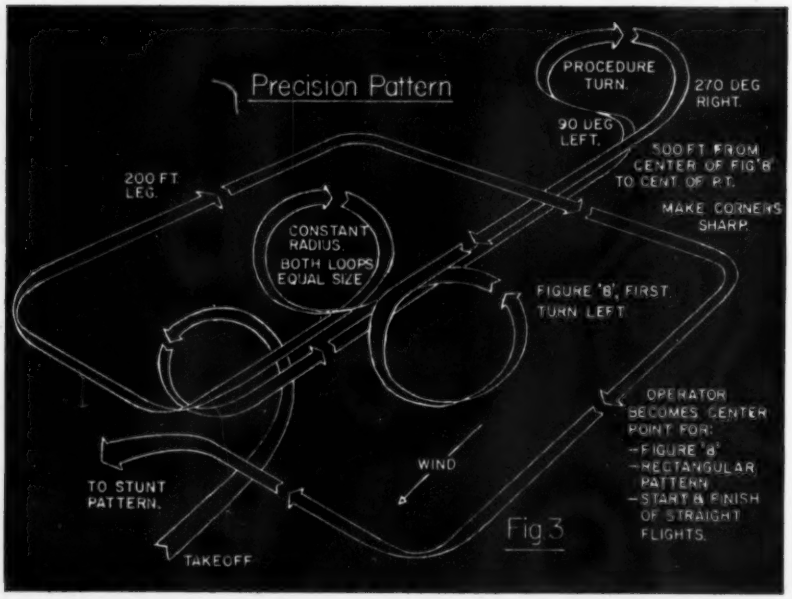


Fig. 1. (see continued matter) shows the ship that won the '57 Nats and several New York Mirror Meets in the rudder-only event. Designed by Dick Allen and Ralph Jackson of Endicott, N.Y., this 5½-foot ship is known as the Lancer, is powered with a Fox .35, features a Robot Synchro for rudder control and a Newx 6-arm escapement operating a Bramco throttle. After over three years of flying the weight is up to 6½ pounds. This ship is clean in design, well built, employs a versatile control-actuating device, a receiver that needs little if any adjusting and which follows a moderate pulse rate reliably. Ralph Jackson is flying a smaller version powered by a Torp .09 and has a Robot Jr. for rudder control.

CLUB NEWS

With all the interest in endurance flying this year, a photo shows what could be done with an old Jasco Floater. This 10-year old model, built by William Northrop, Jr., Hercules Powder Company, Delaware Trust Bldg., Wilmington, Del. uses an SM-1 receiver, Bonner es- (*Continued on page* 58)

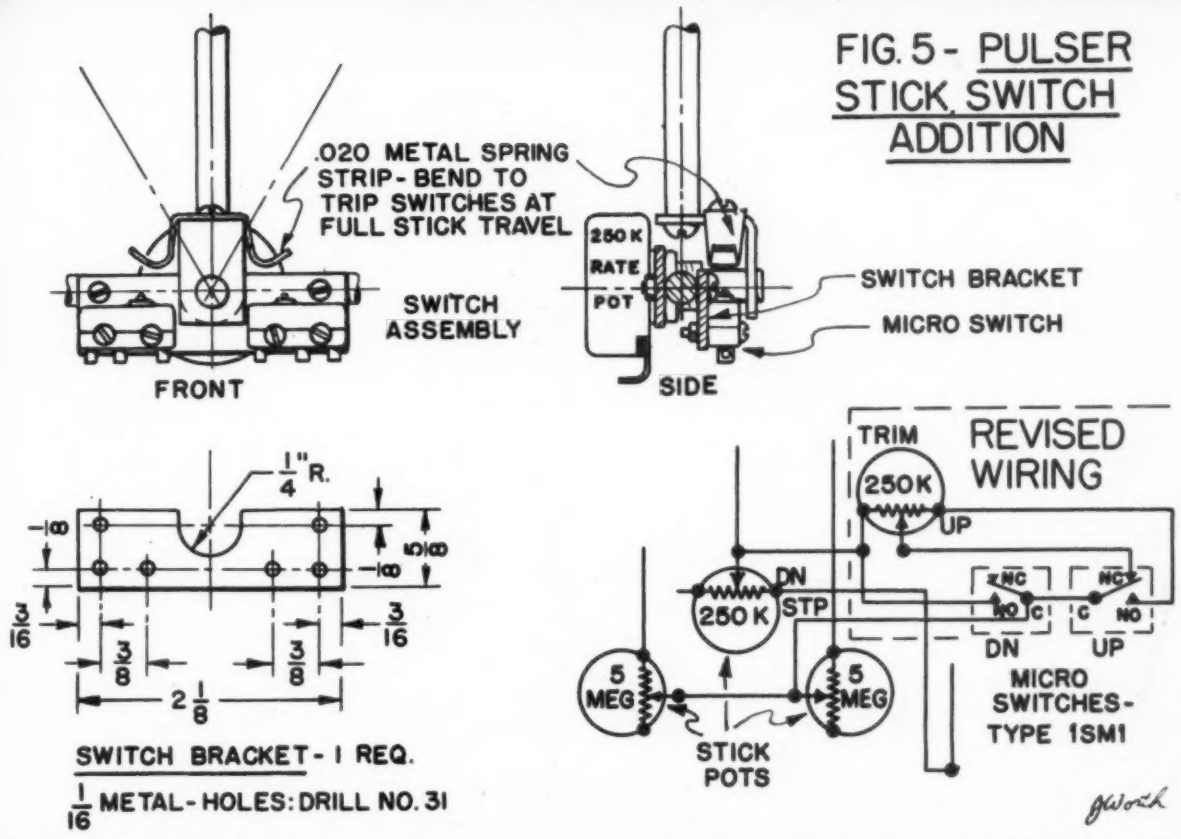


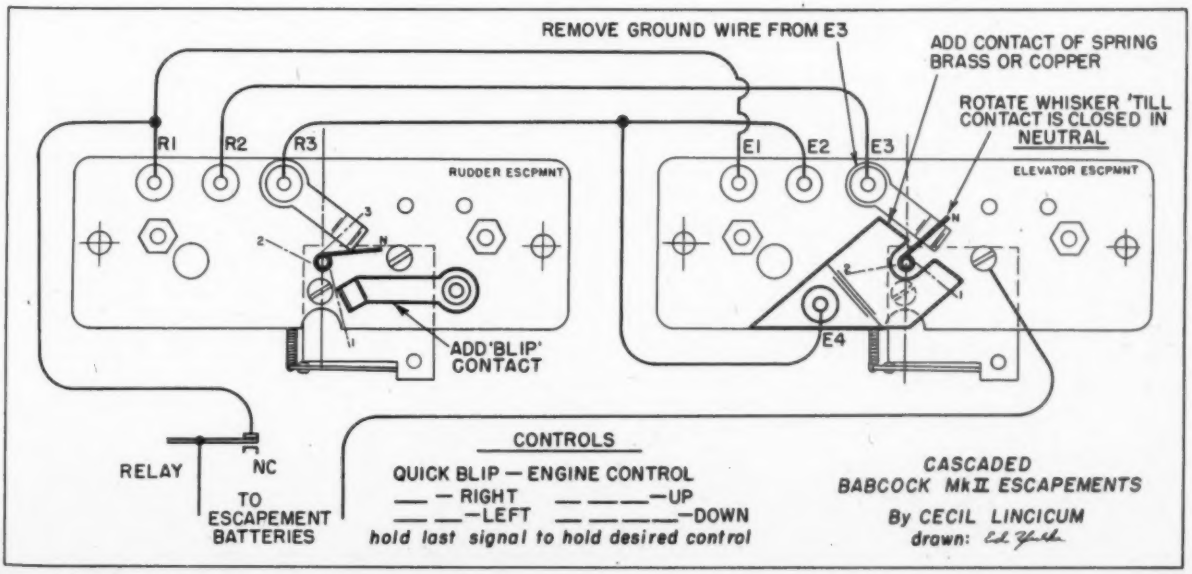
FIG. 5 - PULSER STICK SWITCH ADDITION

More on Simpl-Simul: Received too late for third-part insertion, copy at end of RC News, supplements the September issue article.

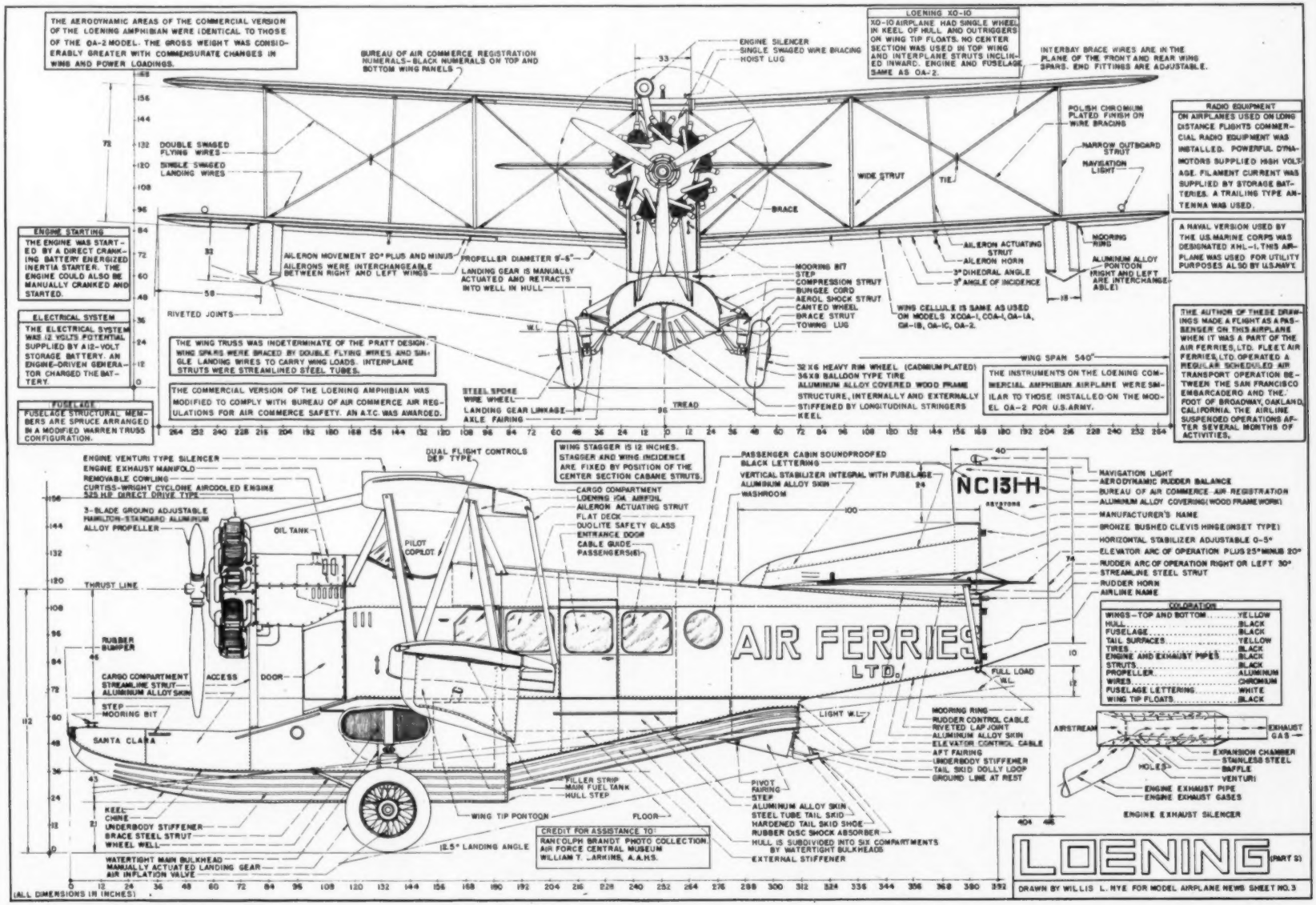
Cascaded Babcocks

by C. L. LINCICUM

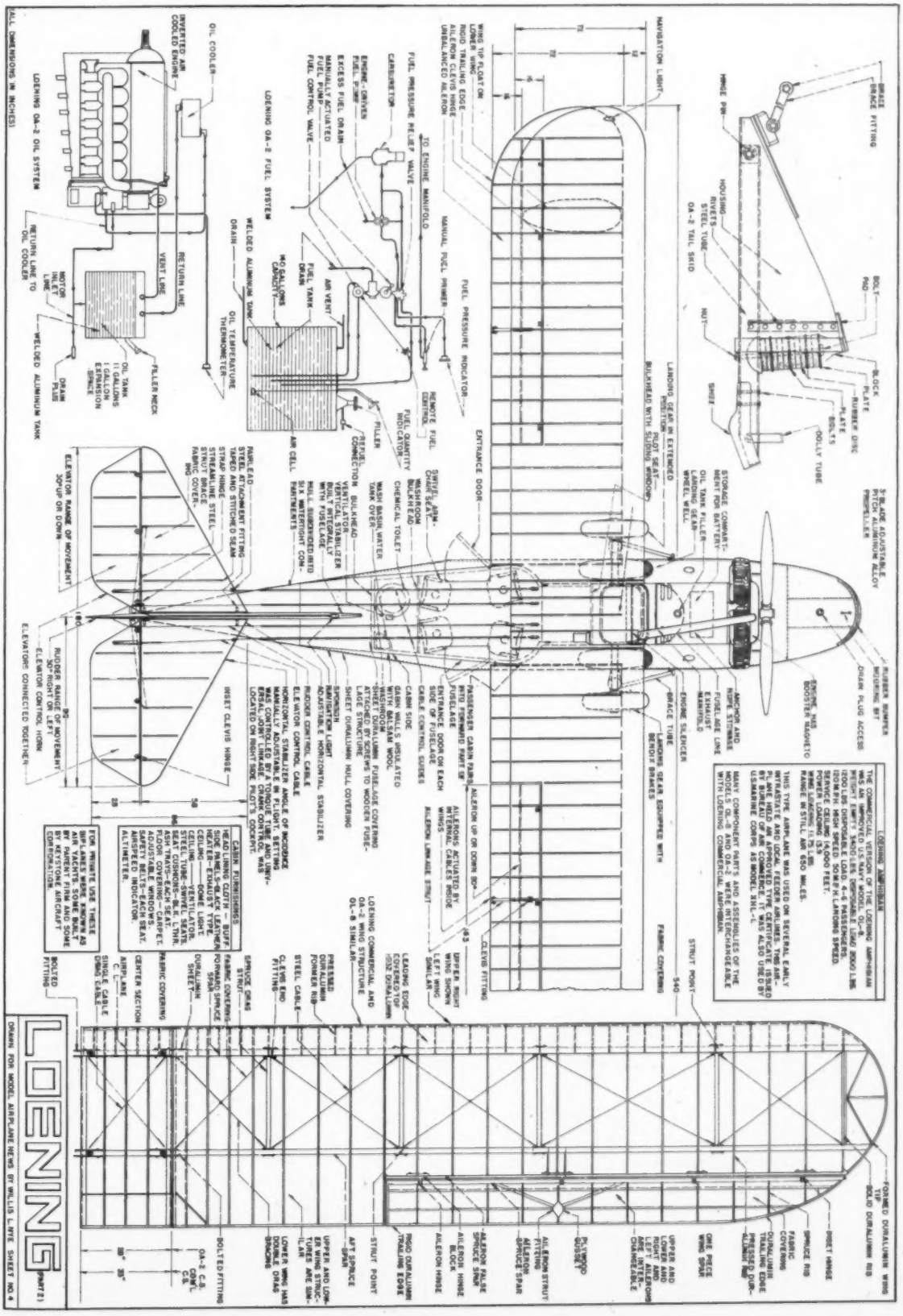
This cascade hook-up uses Babcock MK II escapements in a Live Wire Champion. Rudder escapement rebuilt as per June, 1956 MAN. Elevator escapement has a new contact, (E4). Ground wire from (E3) to ground, removed. Wiper wire on the elevator escapement now serves as a rotary switch. The wiper wire is rebent—in neutral, it contacts contact (E3). Current goes directly into frame of elevator escapement through wire to terminal E3, from E3 to R2 energizing rudder escapement for left or right. On third pulse, wiper wire on the rudder escapement contacts R3 which energizes elevator escapement. As elevator escapement revolves, the wiper wire switches to E4 from E3. Shuts off current to rudder escapement until elevator escapement returns neutral, E3, E4 not grounded frame.

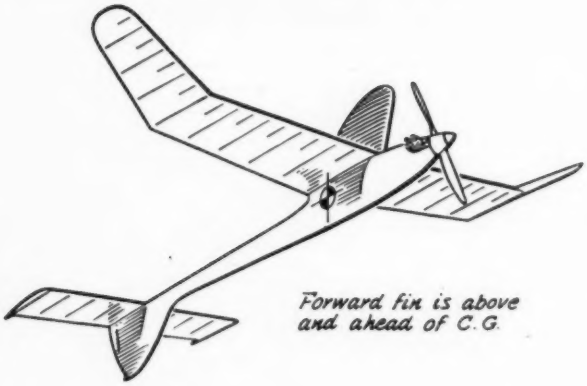


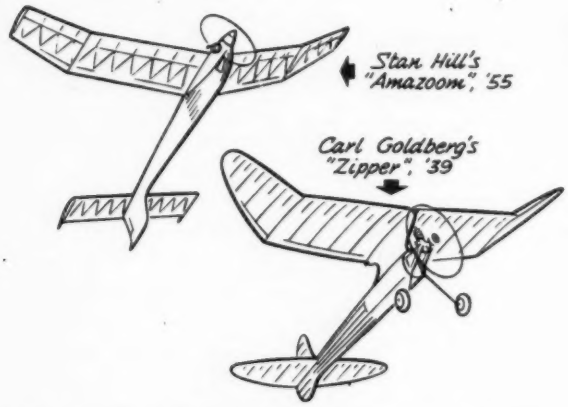
LOENING AMPHIBIONS by Willis L. Nye. Concluding a magnificent four-part coverage of


THE AERODYNAMIC AREAS OF THE COMMERCIAL VERSION OF THE LOENING AMPHIBIAN WERE IDENTICAL TO THOSE OF THE OA-2 MODEL. THE GROSS WEIGHT WAS CONSIDERABLY GREATER WITH COMMENSURATE CHANGES IN WING AND POWER LOADINGS.
LOENING XO-10
XO-10 AIRPLANE HAD SINGLE WHEEL IN KEEL OF HULL AND OUTRIGGERS ON WING TIP FLOATS. NO CENTER SECTION WAS USED IN TOP WING AND INTERPLANE STRUTS INCLINED INWARD. ENGINE AND FUSELAGE SAME AS OA-2.
INTERBAY BRACE WIRES ARE IN THE PLANE OF THE FRONT AND REAR WING SPARS. END FITTINGS ARE ADJUSTABLE.
BUREAU OF AIR COMMERCE REGISTRATION NUMERALS—BLACK NUMERALS ON TOP AND BOTTOM WING PANELS
ENGINE SILENCER
SINGLE SWAGED WIRE BRACING
HOIST LUG
DOUBLE SWAGED FLYING WIRES
SINGLE SWAGED LANDING WIRES
POLISH CHROMIUM PLATED FINISH ON WIRE BRACING
NARROW OUTBOARD STRUT
NAVIGATION LIGHT
WIDE STRUT
TIE
BRACE
RADIO EQUIPMENT
ON AIRPLANES USED ON LONG DISTANCE FLIGHTS COMMERCIAL RADIO EQUIPMENT WAS INSTALLED. POWERFUL DYNAMOTORS SUPPLIED HIGH VOLTAGE. FILAMENT CURRENT WAS SUPPLIED BY STORAGE BATTERIES. A TRAILING TYPE ANTENNA WAS USED.
ENGINE STARTING
THE ENGINE WAS STARTED BY A DIRECT CRANKING BATTERY ENERGIZED INERTIA STARTER. THE ENGINE COULD ALSO BE MANUALLY CRANKED AND STARTED.
ELECTRICAL SYSTEM
THE ELECTRICAL SYSTEM WAS 12 VOLTS POTENTIAL SUPPLIED BY A 12-VOLT STORAGE BATTERY. AN ENGINE-DRIVEN GENERATOR CHARGED THE BATTERY.
FUSELAGE
FUSELAGE STRUCTURAL MEMBERS ARE SPRUCE ARRANGED IN A MODIFIED WARREN TRUSS CONFIGURATION.
AILERON MOVEMENT 20° PLUS AND MINUS
AILERONS WERE INTERCHANGEABLE BETWEEN RIGHT AND LEFT WINGS
PROPELLER DIAMETER 9'-6"
LANDING GEAR IS MANUALLY ACTUATED AND RETRACTS INTO WELL IN HULL
RIVETED JOINTS
THE WING TRUSS WAS INDETERMINATE OF THE PRATT DESIGN. WING SPARS WERE BRACED BY DOUBLE FLYING WIRES AND SINGLE LANDING WIRES TO CARRY WING LOADS. INTERPLANE STRUTS WERE STREAMLINED STEEL TUBES.
THE COMMERCIAL VERSION OF THE LOENING AMPHIBIAN WAS MODIFIED TO COMPLY WITH BUREAU OF AIR COMMERCE AIR REGULATIONS FOR AIR COMMERCE SAFETY. AN A.T.C. WAS AWARDED.
STEEL SPOKE WIRE WHEEL
LANDING GEAR LINKAGE
AXLE FAIRING
MOORING BIT
STEP
COMPRESSION STRUT
BUNGEE CORD
AEROL SHOCK STRUT
CANTED WHEEL
BRACE STRUT
TOWING LUG
AILERON ACTUATING STRUT
AILERON HORN
3° DIHEDRAL ANGLE
3° ANGLE OF INCIDENCE
MOORING RING
ALUMINUM ALLOY PONTOON
RIGHT AND LEFT ARE INTERCHANGEABLE)
WING CELLULE IS SAME AS USED ON MODELS XOOA-1, COA-1, OA-1A, OA-1B, OA-1C, OA-2.
A NAVAL VERSION USED BY THE U.S. MARINE CORPS WAS DESIGNATED XNL-1. THIS AIRPLANE WAS USED FOR UTILITY PURPOSES ALSO BY U.S. NAVY.
WING SPAN 540"
32 X 6 HEAVY RIM WHEEL (CADMIUM PLATED)
36 X 8 BALLOON TYPE TIRE
ALUMINUM ALLOY COVERED WOOD FRAME STRUCTURE, INTERNALLY AND EXTERNALLY STIFFENED BY LONGITUDINAL STRINGERS
KEEL
TREAD
THE INSTRUMENTS ON THE LOENING COMMERCIAL AMPHIBIAN AIRPLANE WERE SIMILAR TO THOSE INSTALLED ON THE MODEL OA-2 FOR U.S. ARMY.
THE AUTHOR OF THESE DRAWINGS MADE A FLIGHT AS A PASSENGER ON THIS AIRPLANE WHEN IT WAS A PART OF THE AIR FERRIES, LTD. FLEET. AIR FERRIES, LTD. OPERATED A REGULAR SCHEDULED AIR TRANSPORT OPERATION BETWEEN THE SAN FRANCISCO EMBARCADERO AND THE FOOT OF BROADWAY, OAKLAND, CALIFORNIA. THE AIRLINE SUSPENDED OPERATIONS AFTER SEVERAL MONTHS OF ACTIVITIES.
ENGINE VENTURI TYPE SILENCER
ENGINE EXHAUST MANIFOLD
REMOVABLE COWLING
CURTISS-WRIGHT CYCLONE AIRCOOLED ENGINE 525 H.P. DIRECT DRIVE TYPE
3-BLADE GROUND ADJUSTABLE HAMILTON-STANDARD ALUMINUM ALLOY PROPELLER
OIL TANK
PILOT
COPILOT
THRUST LINE
RUBBER BUMPER
CARGO COMPARTMENT
STREAMLINE STRUT
ALUMINUM ALLOY SKIN
ACCESS DOOR
STEP
MOORING BIT
SANTA CLARA
KEEL
CHINE
UNDERBODY STIFFENER
BRACE STEEL STRUT
WHEEL WELL
WATERTIGHT MAIN BULKHEAD
MANUALLY ACTUATED LANDING GEAR
AIR INFLATION VALVE
DUAL FLIGHT CONTROLS DEP TYPE
WING STAGGER IS 12 INCHES. STAGGER AND WING INCIDENCE ARE FIXED BY POSITION OF THE CENTER SECTION CABANE STRUTS.
CARGO COMPARTMENT
LOENING (OA AIRFOIL
AILERON ACTUATING STRUT
FLAT DECK
DUOLITE SAFETY GLASS
ENTRANCE DOOR
CABLE GUIDE—PASSENGERS(6)
PASSENGER CABIN SOUNDPROOFED
BLACK LETTERING
VERTICAL STABILIZER INTEGRAL WITH FUSELAGE
ALUMINUM ALLOY SKIN
WASHROOM
NC13HH
AIR FERRIES LTD.
FULL LOAD W.L.
LIGHT W.L.
MOORING RING
RUDDER CONTROL CABLE
RIVETED LAP JOINT
ALUMINUM ALLOY SKIN
ELEVATOR CONTROL CABLE
AFT FAIRING
UNDERBODY STIFFENER
TAIL SKID DOLLY LOOP
GROUND LINE AT REST
FILLER STRIP
MAIN FUEL TANK
HULL STEP
WING TIP PONTOON
FLOOR
PIVOT FAIRING
STEP
ALUMINUM ALLOY SKIN
STEEL TUBE TAIL SKID
HARDENED TAIL SKID SHOE
RUBBER DISC SHOCK ABSORBER
HULL IS SUBDIVIDED INTO SIX COMPARTMENTS BY WATERTIGHT BULKHEADS
EXTERNAL STIFFENER
12.5° LANDING ANGLE
CREDIT FOR ASSISTANCE TO:
RANDOLPH BRANDT PHOTO COLLECTION.
AIR FORCE CENTRAL MUSEUM
WILLIAM T. ARKINS, A.A.M.S.
NAVIGATION LIGHT
AERODYNAMIC RUDDER BALANCE
BUREAU OF AIR COMMERCE AIR REGISTRATION
ALUMINUM ALLOY COVERING (WOOD FRAME WORK)
MANUFACTURER'S NAME
BRONZE BUSHED CLEVIS HINGE (INSET TYPE)
HORIZONTAL STABILIZER ADJUSTABLE 0-5°
ELEVATOR ARC OF OPERATION PLUS 25° MINUS 20°
RUDDER ARC OF OPERATION RIGHT OR LEFT 30°
STREAMLINE STEEL STRUT
RUDDER HORN
AIRLINE NAME
COLORATION
WINGS—TOP AND BOTTOM ..... YELLOW
HULL ..... BLACK
FUSELAGE ..... BLACK
TAIL SURFACES ..... YELLOW
TIRES ..... BLACK
ENGINE AND EXHAUST PIPES ..... BLACK
STRUTS ..... BLACK
PROPELLER ..... ALUMINUM
WIRES ..... CHROMIUM
FUSELAGE LETTERING ..... WHITE
WING TIP FLOATS ..... BLACK
AIRSTREAM
EXHAUST GAS
EXPANSION CHAMBER STAINLESS STEEL
HOLES
BAFFLE
VENTURI
ENGINE EXHAUST PIPE
ENGINE EXHAUST GASES
ENGINE EXHAUST SILENCER
(ALL DIMENSIONS IN INCHES)
LOENING (PART 2)
DRAWN BY WILLIS L. NYE FOR MODEL AIRPLANE NEWS SHEET NO. 3

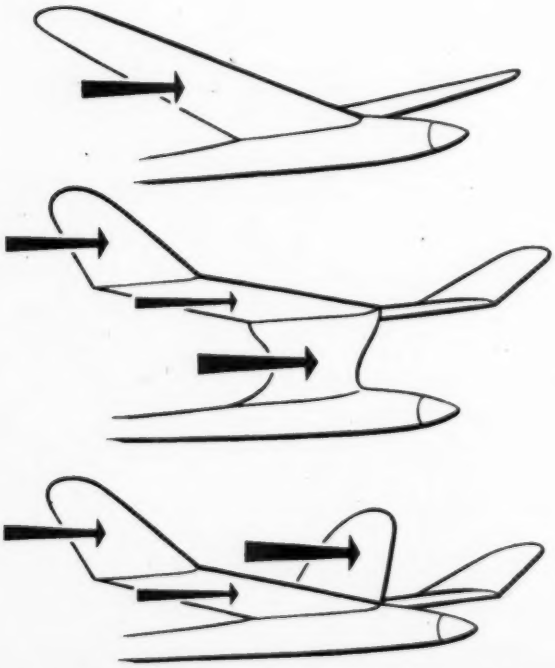
of famous Loening biplane "amphibs." In the twenties the Loenings were commonplace.







Top—Two traditional US approaches to powered free flight, high-thrust line and older pylon. Above—Will this be the new trend?



How corrective action takes place in a slide slip, from top to bottom: shoulder wing, pylon wing, and shoulder wing with top fin.

"Inclined forward" VTO made by Austria's Ernst Blanche during the 1955 World Championships. Forward fin adds to spiral stability.

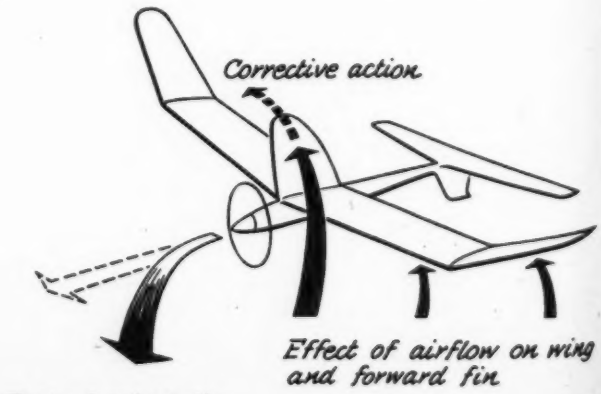
Put a Fin in Front!

by Keith Hoover

Superior stability and better performance may be possible for contest free-flight models by Italian idea for forward fin.

► By using this new combination of proved design factors an improved force arrangement may be achieved which will improve both the performance and consistency of contest free flights!

Let it be clear that no one article can discuss all factors affecting performance. Each designer has his favorite wing and stabilizer airfoils, center of gravity location, tail moment and incidence settings. This article discusses one important factor—force arrangement, which is here defined as the location of the important components of a free flight model—motor, wing, stabilizer, rudder, and side area.



England's Hugh O'Donnell used forward fin on Nordic, '55 Champ's. Model delta designers all have found necessity of a forward fin.

Famed glider and power model designer, Oskar Czepa, of Austria, with a forward-fin entry at the 1955 International Championships.

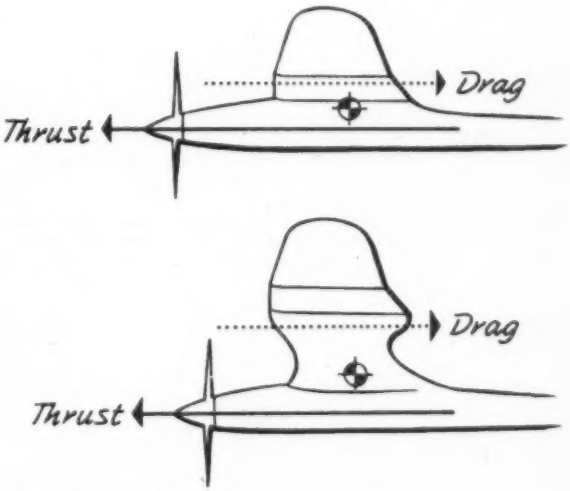
The goals of an ideal force arrangement are simple: 1, lateral stability; 2, spiral stability; 3, longitudinal stability. The problem is to achieve these qualities both under power and in the glide. In American experience, two force layouts have been reasonably successful for contest work. One is the pylon model, unchanged basically from Carl Goldberg's Zipper of 20 years ago. Second is the high-thrust line model, as exemplified by the Amazon–Amazoom series of designs by Stan Hill.

In brief, the pylon provides sufficient lateral stability to permit use of powerful engines in small models, but the looping tendencies of this set-up must be neutralized by tricky adjustment. The high-thrust model, on the other hand, has little looping tendency, but sometimes lacks lateral stability and spirals in. It is possible to combine the best features of these lay-outs and do away with their deficiencies by the use of a little known European design feature—the forward fin.

Though of Italian origin, the forward fin as a means of attaining lateral and spiral stability has appeared on the international scene exclusively on Austrian power models. The first, Lederer's (developed closely with Oskar Czepa), created a sensation at the 1953 world championships in Cranfield, England. This type of design has consistently represented Austria in world events since that time. The outstanding characteristics of these models are straight out, steady climb and consistent flight pattern.

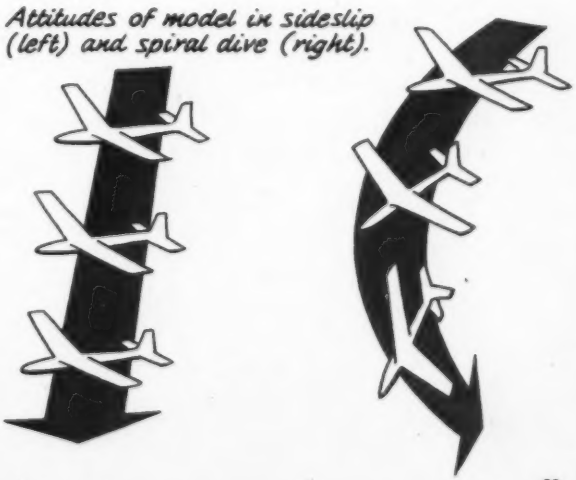
In a step-by-step analysis of the qualities desirable for the contest power model, it is possible to see how the forward fin permits a combination of the good and an exclusion of the bad in a way not previously achieved.

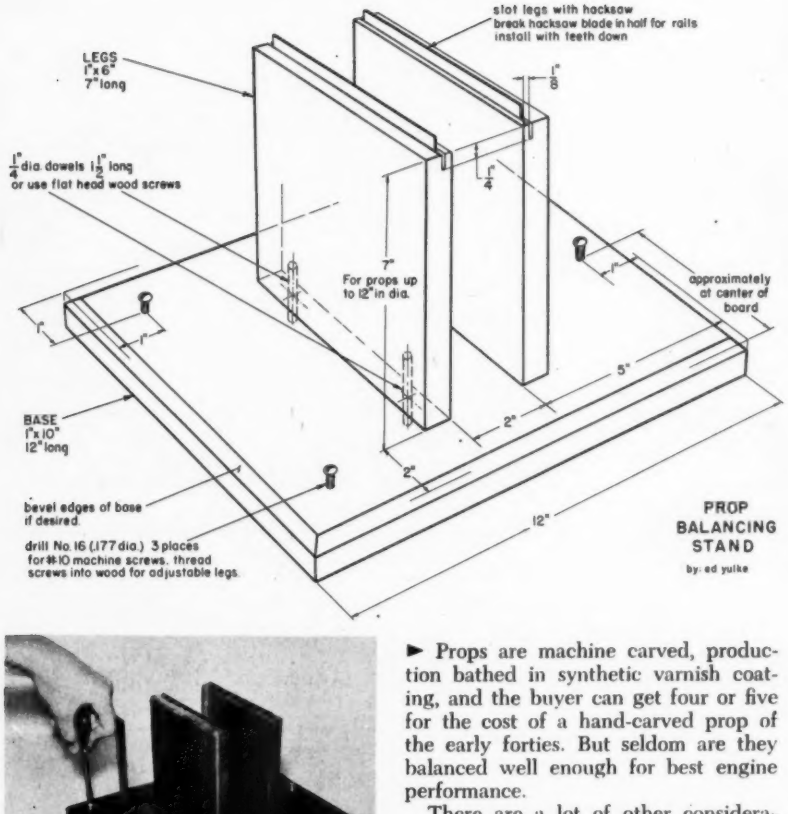
The forward fin achieves best lateral stability. The brilliance of Carl Goldberg's contribution to power modelling lies in his mastery of lateral stability problems by a tremendous increase in dihedral effect. The Zipper was the original "climb" model because of then radical innovations to control the power of the motor. These design features, the pylon and polydihedral, use one principle—increasing dihedral effect without materially decreasing wing area. Dihedral is the most effective insurance against undesired sideslip. Figure 1 indicates the corrective forces exerted during a sideslip on a polyhedral wing atop a pylon and, on a wing with simple dihedral, and on a forward-fin model. Though the amount the wing tip is raised is identical in all instances, note the increased effectiveness of correction with pylon and polyhedral. (*Continued on page* 52)



Couple of thrust about drag noses pylon up, requires tricky adjustments; shoulder wing may wind in. Forward fin good compromise.

Attitudes of model in sideslip (left) and spiral dive (right).

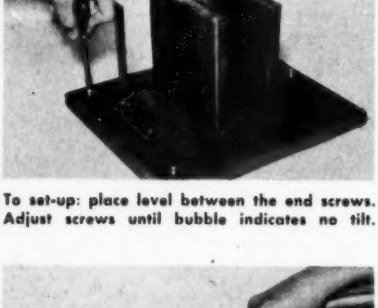




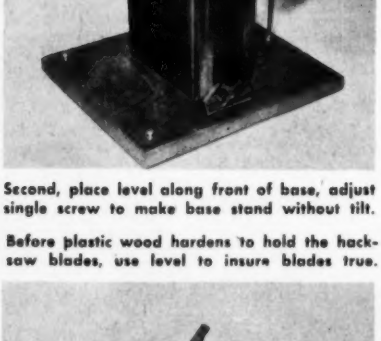
Balance that PROP

by EDWARD H. YULKE

Vibration from unbalanced props helps no airplane or engine. For more power and better performance, especially in RC, make balancer.



To set-up: place level between the end screws. Adjust screws until bubble indicates no tilt.



Second, place level along front of base, adjust single screw to make base stand without tilt.

► Props are machine carved, production bathed in synthetic varnish coating, and the buyer can get four or five for the cost of a hand-carved prop of the early forties. But seldom are they balanced well enough for best engine performance.

There are a lot of other considerations besides maximum revs. A prop slightly off balance will cause "strumming" in a plane at perhaps 7,000 or 8,000 rpm. It doesn't take much vibration to start the fuel in the tank frothing, making for an erratic mixture and the same vibration will bother an r/c relay. Many an innocent receiver has been cussed up and down for not working properly when its relay was being given the "shake, rattle and roll" treatment by a prop that was purchased on the way out to the field and just slapped on the engine.

When you build a simple prop-balancing rig and find that only half of the props you buy are in balance, the others having one blade that rotates downward on the rig. you sit back and think! A piece of 1 x 10 shelving, a few pieces of 1 x 6 left over from building a fence, three machine screws, and four 1½" wood screws and we were off in a cloud of sawdust. For a fancy touch, we bevelled the edge of the 1 x 10 after (roughly) squaring it up to 12" long. It made a good, solid base, so we made the legs out of 1 x 6. Since we build models with .19 engines or less, the largest prop we've had to work with is 12". That fixed the legs at 7" long (an extra inch for clearance at the base). The ends of the leg pieces should be close to square. A block of wood with #3 (road-gravel) sandpaper will easily correct the mistakes of sawing. Then came the question . . . what to use for rails? The top of the 1 x 6 legs were hardly smooth enough. A hack saw blade worked fine. The saw was used to cut the slots in the top of the legs, then the blade was removed, broken in half and presto . . . two rails!

Since any balancing device should be level in both directions (across and fore-and-aft) the three #10 machine screws threaded into undersized holes in the wood (*Continued on page* 40)

Before plastic wood hardens to hold the hacksaw blades, use level to insure blades true.

Short piece of brass tubing to fit hub hole of prop being balanced, free to roll along blades.

Gas model props can be balanced by scraping off varnish or material (carefully!) Try and retry.

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NEW . . . STUNT-SPORT CONTROLINE featuring the famous hollow structed wonder wing.

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"SOMETHIN' SPECIAL"

Thrills galore await you with this exciting new controline model. Sleek lines and top performance assure top enjoyment for novice or expert. Completely prefabricated plus many Enterprise extras make this an amazing value. .15 to .25 engine, overall length 22½", Wingspan 17".

FOKKER D-7 Famous World War I German Fighter. ½A Scale Controline. Satin smooth shaped fuselage and wings. Aluminum cowling, color decal insignia. .020 .049 .074 engines. **Wingspan 17½"** Only **$2.50**

WHIPSAW—Combat-Stunt Controline. Pre-fabricated, Shaped leading and trailing edges, die cut ribs, plywood doublers, hardwood engine mounts, extra sturdy. For .09 .15 .19 engines. **Large 31" wingspan.** Great value at **$1.95**

SKY-LINER—Dual purpose ½ A free flight and rubber powered for sport, precision and PAA load flying. Pre-fabricated parts, formed landing gear wheels, extras. .020 to .049 engines. **Wingspan 32".** Only **$2.50**

"CHIPMUNK"—Canada's pilot trainer. Featuring aluminum cowling, plastic pilot, canopy, plastic spinner and authentic Canadian A.F. decals. For .020 .049 .074 engines. **18" wingspan** Only **$2.50**

P-40 FLYING TIGER—Giant size—super scale, easy to build controline flyer. Featuring "authenti-carved" and hollowed fuselage. For .19 to .35 engines. Wingspan 28" length 23½" **$9.95**

X-15 — Ultra modern design, "satin smooth" shaped fuselage and wing, plastic spinner and canopy, aluminum cowling, pilot. For .020 .049 .074 engines. **17" wingspan** **$2.50**

HAWKER FURY — World Famous British Fighter - scale controline. Fully pre-fab for quick easy assembly. For .049 to .099 engines. **18" wingspan, 18" length.** only **$2.95**

MUSTANG PROFILE—Sport and combat trainer. All parts fully shaped and pre-cut. Authentic full color decals. Complete accessories. For .074 .09 - .015 engines. **21" wingspan.** **$2.95**

CHECK-MATE — Satin smooth, fully shaped fuselage and wing. Complete kit including aluminum cowling, plastic spinner, plastic pilot and hardware accessories. **16" wing span.** **$2.50**

FAIRCHILD PT-19 — U.S. Army Air Force Trainer. "Satin Smooth" shaped fuselage and wings, formed gear, wheels, and full color decals. For .020 .074 engines. **18" wing span.** **$2.50**

SPACE TERROR—World famous "TOWLINE TERROR" redesigned for double use—with .020 engine as sport free flight — or as towline glider. **24" wingspan, 18" overall length** **$1.50**

SUPER LINER—The swell flying "Tow-Liner" now available for Pee-Wee .020 engine—or as a red hot towline glider. Completely pre-fabricated kit. **24" wingspan, 18" length.** **$1.50**

F-51 MUSTANG — One of the finest ½ A scale controliner of America's World War II fighter. Full color decals, Plastic parts, complete plans. **18" wingspan** **$1.95**

HAWKER TYPHOON — A lavish kit featuring pre-fab parts, full size detailed plans, large four color decals. For .09, .15, .19 engines. **Wingspan 31¼", Overall length 22½".** ONLY **$2.95**

L'IL DARLIN' — Super deluxe controline. With sleek, shaped fuselage, NEW recessed wing for L. G. mount. The swellest looking, sweetest flying model ever. **16" wing span** Only **$2.50**

PEE WEE SPORTSTER — Great new ½ A Free Flight. Designed for .020 to .049 engines. Can operate in limited area. **32" wingspan** **$2.50**

RAZZLE-DAZZLE — Sensational new design for terrific ½ A flying. Beautifully shaped fuselage and wing. Complete decal trim. **16" wing span** **$2.50**

F4U-5 CORSAIR — Spectacular Navy shipboard fighter recreated into a realistic scale model. **18" wing span** **$1.95**

SPITFIRE — The fighter that saved England from destruction. A beautiful miniature scale controline authentically recreated with loads of detail. **18" wingspan** **$1.95**

CURTISS HAWK P6-E — Famous Army Air Force pursuit plane of 1930's. A fabulous kit of a great Biplane. Authentic full color decals. Pefect for .020 engines. **14" wingspan** **$1.29**

SPAD — Eddie Rickenbacker's famous World War I fighter; This great "Bipe" will please anyone. Complete authentic decal insignia. Perfect for .020 eng. **14" wingspan** **$1.50**

CATAMARAN CRUISER — Water thrills galore with this unique model. The twin 26" hulls skim at 50 m.p.h. .020 - .074 Eng. Great value at only **$2.95**

F6-F HELLCAT—Miniature controline of plane Navy says was the world's most maneuverable—watch how it flies! **18" wing span** **$1.95**

HOWARD "IKE"—Most famous of American Air Racers. Winner of Shell Trophy. Completely pre-fabricated. Best flying model in the Enterprise scale model ine. **18" wingspan** **$1.95**

ENTERPRISE MODELS, INC. MINEOLA, NEW YORK

If no local dealer is convenient, mail orders will be filled by ENTERPRISE MODEL AIRCRAFT, DEPT. M-108, MINEOLA, NEW YORK. PLEASE INCLUDE 25c packing and postage.

MODEL CEMENT

Comes in two formulations — "A" and "B" — to meet the exact requirements of every type of model cementing job. Available in large economy-size tubes (as illustrated) at 25c; also in handy 15c-size tubes.

FORMULA "A": guaranteed hot fuel proof . . . instant drying for on-the-spot repairs . . . unequalled for quick, easy construction of lightweight models.

FORMULA "B": strongest for all woods . . . strongest for all metals . . . strongest for construction of all models.

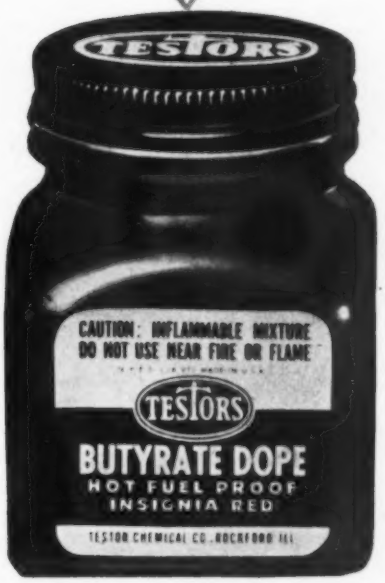
TESTORS

BUTYRATE DOPE

Testor's Butyrate Dope is the finest formulation ever developed for giving a genuinely hot fuel proof finish to engine-powered models. Completely withstands destructive elements in today's high-solvency glo fuels. Applies easily by brush or spray; has excellent hiding power and build-up; dries to a tough, durable film; comes in a popular range of sharp, brilliant colors. Available in ¼-pint square jars (as illustrated) at 50c; also in 15c bottles. In addition, Clear, Thinner, and Sanding Sealer also come in pint cans. (Thinner is $1.00 per pint; others $1.25 per pint.)

For Better Models!

LOOK FOR THE
SQUARE BOTTLE



THE TESTOR CORPORATION
ROCKFORD, ILLINOIS

Flash! *latest*

FCC Rulings involve many important changes.

► Effective September 19, 1958, radio control flying is possible on any of six different examination-free frequencies in the 27 megacycle band instead of on just 27.255mc. The Federal Communications Commission issued an order on July 31 revising part 19 of the Citizens Radio Service rules under which we fly to allow use of any of the following frequencies: 26.955mc, 27.045mc, 27.095mc, 27.145mc and 27.195mc in addition to the existing spot frequency of 27.255mc. The same maximum input power of five watts will apply but 30 watts maximum is permissible on 27.255, shared with trucking, lights, other services.

Many of the readers sent in postcards, letters and telegrams "backing up" the Academy's formal request for more frequencies. The proceeding was known as Docket #11994 which proposed taking the Amateur Band of 26.96mc to 27.23mc from the Amateurs because it was little used by them and reallocating the frequencies to the modelers and to various business services. Not only was this accomplished in their Report and Order, but many other changes were made.

The most important other change made was to allow those of us under 18 (down to and including twelve) years of age to hold valid Citizens Radio Service station licenses. Formerly modelers had to be 18 or over to hold a license, those younger had to have Pop apply for it. Form 505 is still to be used, but will be revised shortly, primarily since that form has an affidavit at the bottom which states that the applicant is eighteen or over. In order to better service the licensing situation, all application forms (505) for modeling station licenses must be sent directly to the Federal Communications Commission, Washington 25, D.C., instead of your local zone office.

Two changes will require the immediate attention of all r/c modelers. One is the reduction of frequency tolerance from the old .04% on crystals to .01% if the current to the final stage is under three watts and down to .005% if the current to the final stage is between three and the maximum of five watts. Most existing r/c transmitting equipment will require new crystals. The other is the addition to part 19 of the Rules that makes mandatory the observing of radio silence in the event of a Conelrad Alert, whether exercise or actual. Heretofore, it was generally understood that all radio transmissions outside of Civil Defense and Conelrad emissions were to cease . . . now they spell it out for us. It will make necessary a broadcast band receiver on the field, either car radio or portable.

Though changes in the 465mc band were contemplated in Docket #11994, not all of them were adopted and the 465mc spot frequency allowed for modelers is retained without change, at least for the present time. Sections of the 460mc-470mc band were reallocated to various radio users, but the "band" of 464.725mc to 465.275mc (brackets our 465mc) was retained for use in the Citizens Radio Service.

1958 NATIONAL WINNERS!

During the week of July 21-27, the 27th Nationals ran off smoothly at the Naval Air Station, in Glenview, Ill.

WHO WON?

Grand National Champ ..... **Woody Blanchard**
Open National Champ ..... **Woody Blanchard**
Sr. National Champ ..... **John Wells**
Jr. National Champ ..... **Dennis Alford**

INDOOR

Stick: Open—L. R. DeBatty, 19:59.2; Sr.—John Diebolt, 13:35.0; Jr.—Brent Hawkins, 11:00.0.
Paper Stick: Open—Jack Land, 12:59.5; Sr.—Sherwin Maslowe, 10:12.0; Jr.—Bob Scoville, 9:49.4.
Cabin: Open—Joe Bilgri, 17:23.0; Sr.—John Diebolt, 4:02.8; Jr.—Bob Scoville, 6:36.2.
Hand-Launched Glider: Open—Joseph Foster, 58.0; Sr.—Stan Watson, 50.0; Jr.—Larry Caillau, 44.0.

GLIDER

Hand-Launched Glider: Open—Theodore A. Cook, 610.4; Sr.—Sherwin Maslowe, 309.2; Jr.—S. D. Oliver, 248.4.
Nordic A-1: Open—Norman Burgdorf, 834.0; Sr.—Neal Henderson, 735.1; Jr.—Larry Wallace, 602.5.
Nordic A-2: Open—R. W. Schuettler, 759.9; Sr.—Richard Tremps, 573.5; Jr.—Danny O'Malley, 608.0.

RUBBER

Wakefield: Open—Charles Sotich, 850.7; Sr.—William Waterman, 765.1; Jr.—Brent Hawkins, 707.0.
Unlimited: Open—Robert Hatschek, 854.0; Sr.—John Scott, 742.6; Jr.—Stephen Stackhouse, 530.8.

FREE FLIGHT

Half-A: Open—Ed Miller, 1531.0; Sr.—Dick Mathis, 1153.0; Jr.—Bill Hunter, 823.0.
Class A: Open—Charles E. Diller, 1906.2; Sr.—Ray La Hood, 996.0; Jr.—Gary Duncan, 1072.0.
Class B-C: Open—Ed Miller, 1362.0; Sr.—Charles Gilliland, 1096.1; Jr.—Bill Hunter, 894.0.
ROW: Open—Vic Cunningham, 824.0; Sr.—Ed Christenson, 717.0; Jr.—Bill Hunter, 737.2.
FAI Power: Open—James Patterson, 864.2; Sr.—Bill Schlarb, 753.6; Jr.—David Edmonson, 434.5.
Flying Scale: Open—Karl Spielmaker, 162 5/6 pts.; Sr. and Jr.—Ed Christenson, 132⅔ pts.
Helicopter: Open, Sr. and Jr.—William E. Kocher, 146.39 pts.
Rocket Power: Open—Joe Forster, 618.1; Sr.—G. E. Ostrowski, 360.0; Jr.—Steve Benko, 368.4.

PAA LOAD

Clipper Cargo: Open—Lawrence H. Conover, 137.25 ozs.; Sr. and Jr.—Donald A. Gurnett, 151.25 ozs.
Jet: Open—Joseph Pusateri, 379.2; Sr.—Frank Levy, 208.5; Jr.—Danny O'Malley, 259.3.
Junior Jet: Herby Schubert, Jr., 318.6.

CONTROLLINE

Speed Half-A: Open—Harris Sheaton, 107.23; Sr.—Edward Pilkington, 99.30; Jr.—Kenneth Knotts, 89.34.
Speed A: Open—Morton & Grogan Team, 143.48; Sr.—Dick Lindy, 135.28; Jr.—Niki Burt, 121.74.
Speed B: Open—Harris & Shelton, 155.11; Sr.—Larry Draper, 142.46; Jr.—Kenneth Knotts, 143.71.
Speed C: Open—Bob Lauderdale, 168.16; Sr.—Jere Draper, 156.46; Jr.—Kenneth Knotts, 141.01.
Proto Speed: Open—Al Stegens, 119.24; Sr.—Robert Heminway, 116.61; Jr.—Tony Kuester, 110.05.
Jet: Open—David Cotten, 173.84; Sr. and Jr.—Duane Kaasa, 149.19.
Stunt: Open—Robert W. Randall, 548½ pts.; Sr.—Arthur Pawloski, 505 pts.; Jr.—Eddie May, Jr., 501 pts.
Flying Scale: Open—Tom Dean, 330 pts.; Sr.—Gary Wegmiller, 274 pts.; Jr.—Jim Veasey, 244 pts.
Combat: Open—William E. Arrowsmith; Sr.—Strether Smith; Jr.—John Ward.
Team Racing: Robert Heminway, 6.92.
U.S. Navy Carrier: Open—Stephen Babin, 463.0 pts.; Sr.—Robert Heminway, 490.99 pts.; Jr.—Alfred Gonzales, 308.02 pts.

RADIO CONTROL

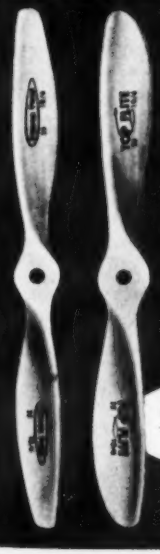
Multi-Channel: Bob Dunham, 213.0 pts.
Rudder-Only: Open—Richard Taylor, 58.0 pts.; Sr. and Jr.—Richard Bennett, 35⅔ pts.
Intermediate: Max Boall, 45.6 pts.
Scale: William F. Bertrand, 88⅔ pts.
Pylon Race: William O. Herschberger, 31.03.

The CHAMPS WIN *with* TOP FLITE & POWER PROPS *for the 11th STRAIGHT YEAR!*

NEWS FLASH!

Here are the WINNERS '58 NATIONALS

GLENVIEW, ILLINOIS



Choose these famous TOP FLITES and POWER PROPS and YOU'LL be right up there with these Nationals winners!

TOP FLITE

ALL THOSE LISTED ARE FIRST PLACE WINNERS

½A SPEED SENIOR
Edw. Pilkington
Hialeah, Fla.
99.3 mph
Engine: K & B 049
Fuel: This Is It
PROP: 4½-7 POWER PROP
Plane: Original

FLYING SCALE CL OPEN
Tom Dean
Corpus Christi, Tex.
330 points
PROP: 9-8 TOP FLITE

½ A GAS FF JUNIOR
Bill Hunter
Sun Valley, Calif.
Time: 823.0
Engine: Holland Hornet
Fuel: Thimble Drone Racing
PROP: 8½-4 PLASTIC TOP FLITE
Plane: Satellite

PAA CLIPPER CARGO OPEN
Lawrence Conover
Cedar Rapids, Ia.
Wt. Lifted: 137.25 oz.
Engine: Thermal Hopper
Fuel: Nitro X
PROP: 8-3 PLASTIC TOP FLITE
Plane: Pelican

A GAS FF OPEN
Charles E. Diller
Riverside, Calif
Time: 1906.2
Engine: Torp 19
Fuel: K & B 100
PROP: 9-4 TOP FLITE
Plane: Ramrod 600

RADIO CONTROL (MULTI)
Bob Dunham
Norwalk, Calif.
213.0 points
PROP: 11-8 TOP FLITE

NAVY CARRIER JUNIOR
Alfred Gonzales
Woodside, N. Y.
Time: 308.02
PROP: 10-8 TOP FLITE

STUNT OPEN
Robert Randall
Indianapolis, Ind.
548.5 points
Engine: Fox 35
Fuel: Fox Super Fuel
PROP: 10-6 NYLON TOP FLITE
Plane: Original

NAVY CARRIER SENIOR
Robert Hemingway
Audubon Park, N. J.
Time: 490.99
PROP: 11-8 TOP FLITE

FLYING SCALE CL JUNIOR
Jim Veasey
Evansville, Ind.
244 points
PROP: 11-4 TOP FLITE

RADIO CONTROL FLYING SCALE
William F. Bertrand
Allen Park, Mich.
88 2/3 points
PROP: 12-4 POWER PROP

JR NATIONALS HIGH POINT WINNER
Dennis Alford
San Diego, Calif.
PROPS: TOP FLITES Used in all gas events.

New ½ A Record R.O.W. GAS JUNIOR
Burt Balleetine
N. Hollywood, Calif.
Time: 11:31.2
Engine: Holland Hornet
Fuel: Thimble Drone Racing
PROP: 8-3 NYLON TOP FLITE
Plane: Satellite 320

A GAS FF SENIOR
Ray La Hood
Omaha, Nebr.
Time: 996.0
PROP: 8-4 POWER PROP

PAA CLIPPER CARGO JR-SR
Donald A. Barnett
Fairfax, Ia.
Wt. Lifted: 151.25 oz.
PROP: 8-3 NYLON TOP FLITE

½A GAS FF SENIOR
Dick Mathis
Dallas, Tex.
Time: 1153.0
PROP: 8-3 TOP FLITE

R.O.W. GAS OPEN
Vic Gunnyngham
Baldwin Park, Calif.
Time: 824.0
PROP: 9-4 TOP FLITE

BC GAS FF SENIOR
Charles Gilliland
Tulsa, Okla.
Time: 1096.0
PROP: 11-4 TOP FLITE

R.O.W. GAS JUNIOR
Bill Hunter
Sun Valley, Calif.
Time: 737.2 (New Record)
Engine: Torp 23
Fuel: Ohlsson 200
PROP: 9-4 TOP FLITE
Plane: Satellite

COMBAT OPEN
William F. Arrowsmith
Rochester, N. Y.
PROP: 10-6 POWER PROP

FLYING SCALE FF OPEN
Karl Spielmaker
Grand Rapids, Mich.
132-2/3 points
PROP: 8-3 TOP FLITE

NAVY CARRIER OPEN
Stephen Babia
Fairview Park, Ohio
Time: 463.0
Engine: McCoy 60
Fuel: Nitro X
PROP: 10-6 POWER PROP
Plane: Original

TOP FLITE MODELS, INC., 2635 S. Wabash Ave.—Chicago 16, Ill.

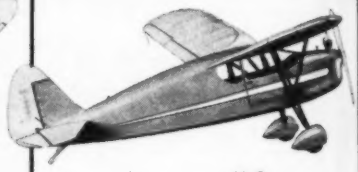
All time Greats with "AUTO-MAGIC"

SENSATIONALLY NEW

An All-New Line—From Classic World War 1 Bi-Planes to Sleek, Twin Engined Executive Transports of Today!

M-1 Rearwin Speedster 22½" Span
$1.95

M-2 Monocoupe 21" Span
$1.95



M-3 Fairchild 24K 22" Span
$1.95

.020 or .049 ENGINES
Fly 'Em Free Flight . . . Control Line OR "Auto-Magic" Pilot

You'll want to build and fly every one of these carefully scaled beauties! Even a beginner can assemble them in a jiffy, because we supply hard-to-make, authentic parts in PLASTIC! . . . Beautifully-detailed wheel pants, cowlings, dummy engines, etc.—you just put 'em together! All balsa and plywood parts are die-cut—kits include formed wire landing gear, authentic decals and easy-to-follow plans!

NYLON PROPELLERS

Safe? . . . at any RPM of today's engines! Tornado NYLON Propellers are almost unbreakable . . . even in ground loops and belly landings.

Rigid Enough? Yes . . . holds shape and top efficiency even under strain of "maneuvers!"

Flexibility? . . . greater than wood.

FUEL PROOF Chemically inert to all special and standard fuels.

WEATHER? Hot?. summer heat cannot soften.
Cold? not brittle at sub-zero.

SMART COLORS Just dip in any boiling type Nylon dye. *Beautiful. Bright. Permanent*

2 Blade Tractor	
5-3, 5-4, 5½-3, 5½-4, 6-3, 6-4	25¢
7-4, 7-6	40¢
8-4, 8-6	60¢
9-4, 9-6, 9-7, 10-4, 10-6	85¢
11-4, 11-6	$1
2 Blade Pusher	
5½-3, 5½-4, 6-3, 6-4	25¢
3 Blade Tractor	
5-3, 5-4, 6-3, 6-4	50¢
3 Blade Pusher	
6-3	50¢

GRISH BROS. St. John Indiana

MORE THRUST from ENGINE TORQUE

Bomarc

(*Continued from page* 19)

the model from 6¼ oz. to 7⅛ oz., for which the wing loading is still satisfactory for a safe gliding descent.

The power, however, will increase from an average thrust of 7¼ oz. for the Scorpion "600" alone, to a total thrust of 9 oz., with all the engines combined. This not only provides the three engine version with a slight edge in power, but also with the same power set-up as the original Bomarc.

Construction: Select all the materials required, bearing in mind that model's success will depend largely on how lightly it is constructed. The flying surfaces are constructed first. Cut out the required number of ribs and the main wing spar. Seen in the front view, the wing surface is tapered from the bottom, permitting a small amount of built-in dihedral. While this is highly recommended, it is not absolutely necessary.

However, it is very easily accomplished by merely propping up the ribs at their respective stations and aligning them with the leading and trailing edges which are raised to the desired angle. We would advise that both wing panels be constructed independently and that the main wing spar not be installed until the wings are joined to the fuselage.

The fuselage and pod construction are basically the same, so in order to avoid duplication we shall consider them as one. Begin by cutting out all the required formers and the curved keel pieces for the fuselage nose. The simple, straightforward streamlining, without complex curvatures, eliminates the need for constructing one-half shell at a time.

Instead, merely join the formers with the keel pieces a few at a time, always checking to see whether you are maintaining proper alignment. The rear formers, where the augmenter tubes are shown installed, should be slipped on the tubes and cemented in place with a heat-resistant cement, before the keel pieces are cemented into their respective notches.

When this much has been completed, cement the main wing spar in position on former 7 and then cement the top side stringers in position. Join the wing panels in position on the main wing spar, against the fuselage. Be careful to maintain the correct horizontal position of the surfaces as well as the desired angle of incidence.

Start planking the top portion of the fuselage and pods. With this completed you will be able to line the top of the engine hatch with aluminum foil and in the most critical area, add an asbestos liner right over the aluminum foil. Install the engine mounting stub for the Scorpion "600", and if the "50B's" are also used, install the plywood-balsa mount as shown.

Complete the planking. Do not forget to line the engine access hatches, as was done to the top of the engine housing. With the planking completed, shape and hollow the soft balsa blocks required to complete the fuselage nose and the "humped" section.

Add remaining details to the fuselage and pod, and then sand all the surfaces to a smooth finish. Use as little filleting as possible, to keep the weight down. Cut slots in the fuselage rear planking, to install the tail surfaces. This is much stronger than just butt joining them to the fuselage.

Covering and finish: The wings are covered with light-weight tissue paper, the top of the wings first, the bottom last. Since the wings are basically dark blue and white, we would suggest that the top of the wing be covered with dark blue tissue in the center and white at the tips—the

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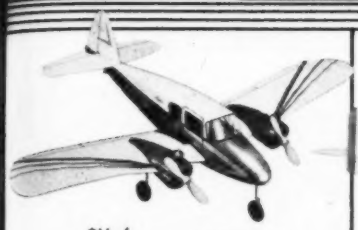

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Piper Apache
23½" Span
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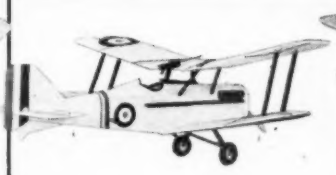

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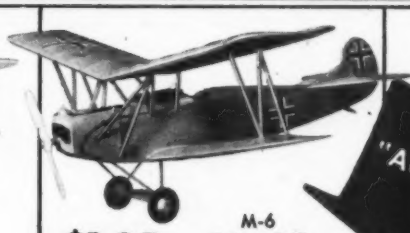

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wing bottom vice versa.

For the fuselage and pods mix a dark blue dye into clear dope to obtain a light-weight colored finish. Do not apply more than three coats if you want performance. The nose is a cream color; use regular colored dope, as the added weight forward will help obtain the proper balance.

The model's finished appearance can be enhanced by adding the remaining trim. decals and markings, all of which can be obtained at the local hobby shop.

Flying: Chances are the model will be slightly tail heavy, and it would be best to add some ballast in the nose to bring the balance point reasonably close to the point shown on the plan. Test glide the model in a grassy area, to determine whether the model's balance is approximately correct. Add or subtract ballast until it appears as though a suitable angle of glide descent has been established.

Whether the model is powered by just the Scorpion "600" or with the two "50B's" in addition, all preliminary flight tests should be made with the "600". However, leave the "50B" engines installed without fuel to maintain desired balance.

All the engines can be fired-up easily, by inserting a cigarette or burning wick on a stick, through the augmenter tubes, igniting the fuse which runs into the engines.

When you get around to three-engine operation, the following procedure is recommended. To begin with, because the "600" is centrally located, this is the last engine we want to "fire-up". As for the "50B's" we would want the one that is normally the inside engine on a power turn, to "fire-up" first. The varying lengths of fuses to use will depend on your dexterity. It might be a good idea to check yourself out on this procedure.

Another thing to be careful of, is the transition from "power-on" to "power-off". Generally speaking, if you have trouble of this nature, it is probably because the model is climbing dead ahead. We resolved this problem quite satisfactorily by adding a shallow turn in the climb and glide.

BILL OF MATERIAL

(2) 1/32" x 3" x 36" (soft)	Fuselage, pod and wing planking
(3) 1/16" x 3" x 18" (med.)	Fuselage and pod bulkheads; wing ribs; tail surfaces; keel pieces; gussets
(1) 3/32" x 3" x 36" (med.)	Fuselage and pod bulkheads; wing ribs; gussets; wing tips; main wing spar; pod mounts
(2) 1/16" x 1/16" x 36" (med.)	Pod keel pieces
(6) 1/16" x ¼" x 36" (med.)	Fuselage keel pieces and top side stringers; rear wing spars
(1) 3/32" x 3/32" x 18" (med.)	Front wing spar
(1) 3/16" x 3/16" x 36" (med.)	Wing leading edge
(1) 3/32" x ¾" x 18" -tapered (med.)	Wing trailing edge

Cement; 1/16" plywood; asbestos liners; soft balsa blocks; clear and colored dope; decals; sandpaper; Jetex Scorpion "600"; two Jetex "50B" (optional); mounting clips; augmenter tubes; .005" aluminum sheet; stiff paper; tissue paper covering material.

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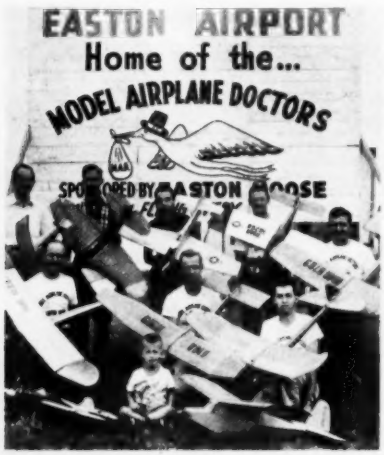

M.A.D. members (standing, l. to r.) Eli Weaver, Draycott Hooke, Bob Shillis, Bill Andrews, Charles Cortright. Kneeling, Ray Volkert, Bob Gutai, Nelson Itterly. Front, Mascot Jack Volkert.

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Easton, Penna.—There's always a unanimous vote by members of the Model Airplane Doctors Club when they cast their ballots for their favorite liquid cement. According to Ray Volkert, club secretary, the MADs have 61 members and "every one of them uses Ambroid."

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Foreign Notes

(*Continued from page 2*)

withdrawn, partly to enable full production facilities to be devoted to the Tiger Mk. III and partly because its high performance led to a certain amount of trouble with the crankshaft. The new Cub is an entirely fresh engine, having a much lower stroke/bore ration, a massive (⅞ in. dia.) shaft and is lighter and more compact.

The Oliver concern still makes engines in only as many dozens as mass-production factories make thousands. It will remain that way. Personal and individual attention to each motor is one of the things that keep Oliver engines on top.

JAPAN

We have lately sampled the first of a new line of R/C actuator units from Oishi & Company (Takatsuki-cho, Ika-gun, Shiga Pref., Japan) which is both well-made and moderately priced. This is the 'MK' Servo, type 3PN, having the usual push-pull rudder control and rotary third control and limit switching. Complete unit is mounted on a micarta type base panel and covered with a light aluminum shell. Weight is just three oz. Also available is a 2P2N (two position, two neutral) servo for use in conjunction with the 3PN for engine control, etc.

POLAND

The third Polish (free-flight) Championships were held June 2-5 at Krosno. Events, for Wakefield, FAI gas and A2 glider were strictly in accordance with World Championship rules. Some original thought and superb construction were seen in the models.

In the Wakefield, many models featured long fuselages and high aspect-ratio surfaces, giving an appearance resembling a cross between the typical American long-fuselage design first seen several years ago, with the current complex structures favored by the Russians. The A2's followed the usual slim (mostly stick type) fuselage with high aspect ratio wings and tip dihedral. The gas event featured both conventional and highly unorthodox models. Winner Wieslaw Schier, for example, flew a unique high-thrustline ship having a sort of inverted pylon below the fuselage, carrying a long narrow nacelle projecting below the prop.

The Wakefield event was held in good weather on June 3 and resulted in a win for S. Zurad of Wroclaw with a total of 13:50. Second was the well-known Warsaw modeler, W. Niestoj and third was A. Kossowski. The weather was dull and rainy for the gas event on the second day. The most widely used engine was the Polish Jaskolka .15 cu. in. Diesel, designed by Stanislaw Gorski who was, himself, flying in the event. Other motors included the East German Zeiss Aktivist and Schlosser .15 Diesels. Wieslaw Schier's winning time in this event was only two seconds short of a perfect five flight maximum. He was followed by T. Pelczorski and K. Giralski in second and third places.

Conditions again changed on the third day, the A2 contestants being greeted with strong winds. A. Sulisz won with a total of 12:19. Second and third were R. Fidela and M. Krzyzon. The Warsaw entry took the team prize for the meet.

ARGENTINA

Held for the first time this year, the three-day International event at Buenos Aires saw entries from Argentina, Brazil and Chile. Events, to FAI rules, included Wakefield, FAI gas, A2 glider and C/L stunt.

Model design at the meet mainly favored U.S. trends in stunt and free-flight gas, while European influence was apparent in A2. Winning stunt performance came from an Aldrich Nobler, from MAN plans, and Fox .35 powered. In addition to American engines, Japanese, Italian and German motors were represented. Aggregate results gave a win to the Argentine team, who had a single point lead over Brazil in the final count.

IN BRIEF . . .

Italy . . . Super-Tigre's latest 'V' version of the G.24 .60 cu. in. racing motor gets a good report in the Italian magazine Rassegna di Modellismo. The G.24 is a drum rotary induction motor of very compact dimensions (overall height is only 3.7 in. to cylinder head) and, of course, features a ball-bearing shaft and ringed aluminum piston. Using a 40/40/20 mix of methanol, nitro and castor, in an air temperature of 79 deg. F. and 70% humidity, the G.24V turned up 14,900 rpm on 9/10 and 14,400 on 9/11 Tornado props.

British West Indies . . . High praise for a 1953 Fox 35 comes from C. E. Berridge of Trinidad. Ater being crashed innumerable times with nothing worse than a broken needle-valve, the engine now tows a 3½ lb., 600 sq. in. stunt job at 60-65 mph, does all the stunts in a stiff breeze on 70 ft. lines and needs only a straight 75/25 methanol and castor fuel.

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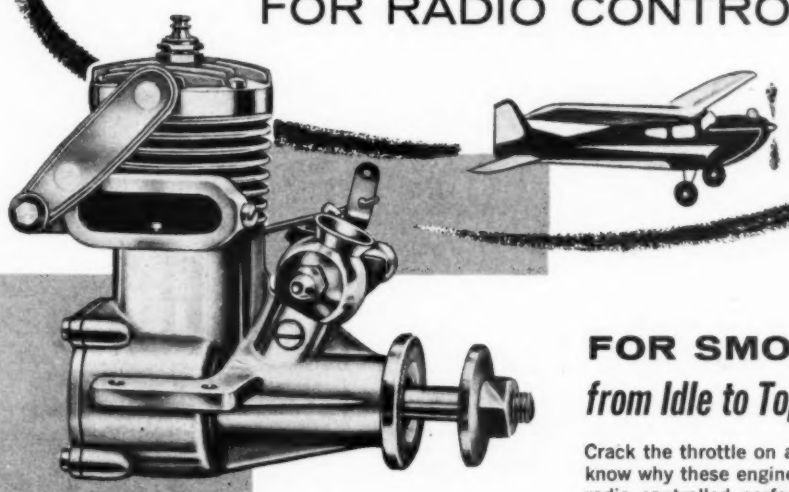

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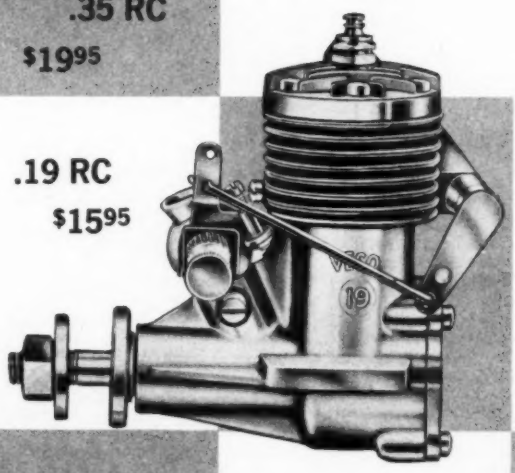

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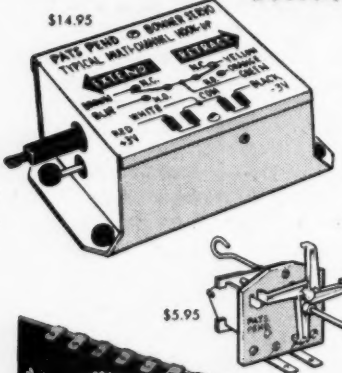

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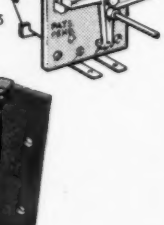

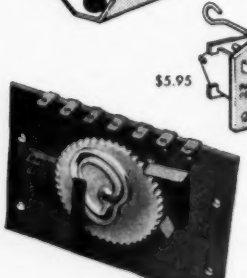

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Balance that Prop

(*Continued from page 30*)

base made an ideal three-point suspension. The screws were turned in until about a half inch stuck out through the bottom of the base, then the spirit level in our machine square came into play. Any small spirit level, including those from the five and dime, can be used. As the pictures show, level between the two screws on one end first, then swing the level across in front of the legs and level it up in the other direction. Once the base is level, slip some plastic wood into the slots of the legs and push the half-hacksaw blades into the slots with the smooth back edge up. The last step is to level up the blades. Lay the level along each blade and across them at the center and at each end. The plastic wood allows the blades to be moved up and down until they are parallel and level. Once you get that condition, put the rig aside for a few hours, preferably on the furnace (the plastic wood will set faster).

The thought may occur to you that the base need not be level, if the blades are, and you're right. In addition to being impatient, we're lazy and it seems to us that once the base and blades are both levelled in making the rig, the spirit level can then be simply laid on the base each time the rig is used.

The brass tubing found in all hobby shops makes excellent mandrels or "axles". Simply cut a piece of the right diameter for the props you're using about an inch longer than the distance between hacksaw-blade rails. The mandrel must be a snug fit in the prop shaft hole.

When the plastic wood that holds the rails in place is dry, a few light rubs across the rails with emery paper or a carborundum stone to remove any irregularities and

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you're ready to see how many of your props are actually in balance.

To set the rig up, level the base with a spirit level as shown in the photo, simply turning the screws up or down as needed to bring the bubble to the middle.

Now slip a prop on the mandrel and lay it on the rails. Mark the blade that swings to the bottom, take the prop off the rig and scrape some varnish off the heavy blade until the prop no longer rolls on the rails, with one blade down. A balanced prop will stay in whatever position you put it on the rails. If scraping off the varnish doesn't balance the prop, check the distance from the hole to the tip. Each blade should measure exactly the same. One last word of caution . . . mark the hub of each prop when you balance it, so you'll know it's balanced as you put it on the engine.

Plastic props can be balanced just as the wood ones are, by simply scraping the surface of the heavy blade.

"Cutlass"

(*Continued from page 23*)

from which bulkheads will be cut. Slide them in turn under the jig, tight against the stop, and cut away triangular sections with your X-Acto knife to form bulkheads. Number each bulkhead with soft lead pencil. Top and bottom bulkheads are identical. Note that two extra No. 4 bulkheads, of ¼" sheet, are required for the forward landing gear mount. Cut rear bulkhead from ¼" birch plywood and drill for rear intake of Cox engine. (If you are using a shaft-valve engine with special crankshaft, your mounting will be simplified.)

Build tank of .005" brass shim stock or tin can stock. Note length of filler tube.

Cut crutch from soft ¼" sheet. Drill for location of tank filler tube. Pin crutch to a sheet of ¼" balsa stock, taking care to sandwich a sheet of wax paper between crutch and the ½" balsa to prevent cementing troubles later. Drill through the ½" balsa so that the long filler tube may pass through the balsa when the tank is installed. Lay the ¼" balsa on your work bench so that the rear portion hangs over the edge, and so that the long filler tube may pass through sheet during the course of construction.

Form front landing gear. Sandwich between two No. 4 bulkheads of ¼" sheet which should be cemented together with Elmer's Glue-All. Compress the sandwich with gear in place in a vise and allow to dry.

When dry, erect all bottom bulkheads, including landing gear mount sandwich, on bottom of crutch. Pin erect, using a square to assure that they have no rake fore or aft.

While bulkheads are drying, make engine mounting plate of tin can stock and screw to forward (i.e., inside ship) face of rear bulkhead (¼" birch plywood) with 2-56 machine screws. Mark location of radial engine mounting screws for side-mount engine position, drill through rear bulkhead and tin engine mount. Mount engine to bulkhead with 2-56 machine screws. Solder all 2-56 nuts to the engine mount. Take care that the solder does not bind the three engine mount screws, but let it bind the screws holding the engine mount to the bulkhead. Cut off extra length on all machine screws. Dismount engine from bulkhead.

Cement rear bulkhead to crutch, squaring it by use of ¼" balsa supports as shown in plans. We used Elmer's Glue-All in this location. The balance of the ship, unless otherwise specified, was assembled with Aero-Gloss C-77 Hot Fuel Proof Cement, although Elmer's works fine, too. (Use your favorite cement—Editor).

While rear bulkhead is drying, enlarge

(*Continued on page 44*)

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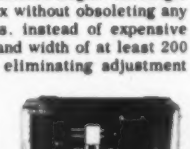

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wing drawings to full size. Cut rectangles of ⅛" soft balsa sheet to sizes shown for construction of ribs. Note that these ribs are flat-bottomed. Their flat bottoms simplify construction and assure the required degree of symmetry of wing construction. Cut and sand ribs to shape.

Cut 1/32" soft balsa sheets to shapes needed to form bottom surface of wing. Butt cement edges together. Cement all ribs in place except false ribs to be spotted over landing gear mount. Do not at this stage turn the leading edge up, but leave flat.

When dry, cut ribs away where required to install control surface spars and false spars to which controls are hinged. Note short extra rib required at inboard tip of each control surface. These spars are cut from ¼" soft stock and should be planed and sanded carefully until they are just flush with the ribs they butt.

Now cover the upper surface of the control surfaces only with 1/32" sheet. Cut and form horns from tin can stock. Cement as shown to top of control surfaces, and reinforce with small patches of nylon cemented atop them.

Now cement two halves of wing together and allow to dry thoroughly. When dry, form main landing gear, bind to patches of 1/16" mahogany plywood with soft brass wire. Pierce wing and cement landing gear mounts in place with Elmer's Glue-All. Add false ribs atop these mounts, making sure with a straight edge that they are correctly shaped, so that they will not make for any irregularity in wing. Mount both bellcranks. The pivots are supported by small patches of 1/16" plywood.

Form crossbar running from inboard to outboard bellcrank of 1/16" steel rod, and install. Allow only minimum holes for its operation in each rib, to prevent undue flexing.

With bellcranks pinned in neutral position, form from 1/16" steel rod the pushrods to the control horns, and make temporary installation to check dimensions. Cement 1/16" plywood line-guide to inboard wing tip, properly drilled for leadout wires. When dry, install lead out wires. If you have followed this plan (and have not yet cut the control surfaces free from the wing), your control system will be "square." Solder bellcrank nuts with resin-core solder.

Add ¼ ounce of weight to outboard wing, just inside tip rib, and as far forward as possible. Cover upper surface of wing with 1/32" sheet, taking care to have all butt-joints smooth. Careful work with fine-point pins will pay off here. It is at this point that the lower surface leading edge is curved upward to meet the upper surface leading edge. Be generous with cement at leading edge—it will prevent cracking and chipping later. Add solid balsa wing tips and sand to shape.

Loosen pushrods from control horns. Carefully saw through wing tips to tip ribs along hinge line. Slide your X-Acto knife blade between the control surface spar and the false spar to which it is hinged, cutting control surfaces free of wing. Round leading edge of control surface with sandpaper, and likewise round the spar to which they will be hinged. Hinge control surfaces to wing with cloth hinges, taking care to sand inboard edges of control surfaces to permit easy clearance. Hook up pushrods and solder "keepers" to them. Your wing is now complete.

Turning back to the fuselage, shape and install fuel tank. Cut fuselage bottom to shape from 1/16" sheet. Pierce for forward landing gear and over-flow tube.

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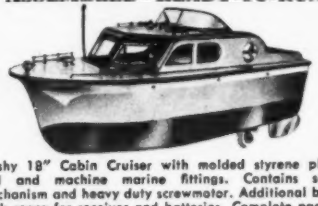

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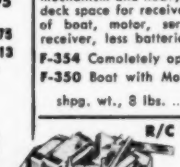

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Cement fuselage bottom in place, with tank installed. If your crutch is firmly pinned to the ⅛" stock, the springing of the bottom will not flex the crutch. Cut a fuselage side to shape. Removing the pins holding down one side of the crutch, cement to ship, replacing pins so that they go through fuselage side into crutch and hold crutch flat against the ⅛" stock. Repeat for opposite side.

When dry, remove from ⅛" sheet and install engine. This will require some cutting away of the crutch to permit fitting in the rear intake of the Cox .049. Shaft-valve engines, of course, will mount more readily.

Cement wing to crutch, cutting same out to permit clearance for filler tube. When dry, mount top bulkheads as shown. Because it is a little tricky to get the correct height for these bulkheads, it pays to spring a strip of 1/16" x ¼" balsa across top of bulkheads. If you find any bulkheads too high, trim off the bottom and reinstall. Don't try trimming off the top—you'll wind up with compound curves, which are strictly no good.

Cut fuselage top to shape. Pierce for filler tube, cement and pin to bulkheads. When dry, add sides. Sand front bulkhead smooth and add nose block, sanding to shape when dry.

Cut small bulkheads for rear portion of canopy, mount, and later add top and sides. Pin curving strips of ⅛" square balsa to provide inner outline of transparent forward canopy. Add canopy brace of 1/32" steel rod, shaped as shown. Paint portion of top of fuselage which will lie inside plastic canopy with two or three coats of fuel-proof black dope. Cut clear plastic to shape for canopy. Cement and pin canopy in place. It is not necessary to cement canopy to the 1/32" steel brace—the portion of canopy aft of the brace should be installed first, and the windshield portion so cut that it extends slightly beyond the aft portion, thus securing it to brace.

You may, if you care, at this point add the after-burner to fuselage. We chose to omit it, as the illustrations show, for easier cranking and simpler engine changing possibilities.

Cut out balsa fuselage sheeting for access to intake between last two bulkheads on outboard side, above crutch only. With engine dismounted, flow two or three coats of butyrate dope into entire final compartment.

The rudders on this ship must be kept light, but they are too sizable to be left weak. We laminated two sheets of 1/32" balsa with grain at right angles, using Elmer's Glue-All. This fix gives you a strong and very flexible rudder. Mount rudders to wing, using ⅛" square filler strips to top and bottom as shown. Wrap fine sandpaper around a pencil or thin dowel and sand filler strips to streamline fillets.

You can't afford too much weight in the finish of your Sharp Cutlass. We fine-sanded the whole ship, being especially careful of butt joints on the wing. Occasional use was made of Aero-Gloss Plastic Balsa. When dry, brush ship free of sanding dust and give two coats of fuel-proof colored dope. The original was Curtiss Blue with white fuselage.

Now comes a most important part of the job:

Balance your sharp Cutlass exactly—and we do mean exactly—at the balance point shown on the plans.

Because we used a pretty large tank, we found it necessary to add a small amount of ballast to the nose. Cut a small square hole in the top of the fuselage forward of the canopy, between bulkheads 1 and 2 and add BB shot until the ship balances at the

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indicated point. Cover hole temporarily with masking tape. When you have test-flown your sharp Cutlass and are satisfied with her balance, replace the small piece of wood cut out, sand and touch up with colored dope.

Before firing up your little mill, we recommend you testwhip your sharp Cutlass on eight or 10-foot lines. U-Reely Control is handy for this job, and for all flying, for that matter. If your Cutlass needs any down control to whip on short lines, or if she hunts vertically, add ballast until she smooths out. Properly balanced, she is sensationally stable.

When you've gotten the setting right, hook up 40-foot Orlon lines, crank up and fly. Control response is more leisurely than in conventional lay-outs, and at low speeds this configuration is slightly nose heavy. Best to land her fairly fast. Best of all is to hand launch and pay out from your U-Reely control.

Engine Review

(*Continued from page* 35)

an engine is overrevving, it cannot breathe enough air to do very much real combusting and so this relieving pressure is considerably reduced, while inertia loads increase as the square of the piston speed. Result, more bearing load in RC engine and remedy more oil, hence added oilways.

As described in the recent test of the Fox .25, the new Foxes have ribs for the cylinder head hold down screw tappings which extend right down to the exhaust stack. It was found that this prevented a tendency for the cylinder bore to distort and grip the piston when the head was tightened.

Profiting from experience with the 29R, the new engines have half-inch diameter main bearings, which are bushed with high quality bronze after much investigation of alternative materials, and ⅜" intake bores. These are first class .60 racing engine dimensions and give good cause for serious thought about future development of the big stuff. It seems possible, if incredible, that a half inch shaft is not big enough for a .60. The ball-bearing manufacturers say that their bearings are overloaded in a sixty but the right size will not go in the crankcase. Interesting problem if big radio ships get down to cut-throat racing.

Identical pistons of lightweight design from bar stock are used in both engines, but the cylinder liners differ considerably. The Combat engine has high, wide ports suggesting the expected degree of potency, while the radio machinery has ports that are 25% lower and a 10% narrower exhaust. This has the effect of reducing the BHP produced by impeding gas flow, but increasing the torque output by keeping the expanding gases in the cylinder for a longer crank angle period, with consequent advantage on big props. Although the geometric compression ratio remains the same, the effective compression ratio is raised by the use of lower ports, and the presence of an aluminum ring between the liner flange and the top of the main casting shows that port timing and compression ratio have been adjusted carefully to best advantage.

The cylinder heads are entirely different. While the Combat head is the familiar Fox shape with center plug and recess for the straight piston baffle, the radio version illustrates by its sheer novelty that it did not get that way quickly or easily.

Of all the various methods used to obtain power control of the glow-plug engine, exhaust throttling is probably the most practical. Two needles and rich mixture is dirty, and pickup uncertain as the plug cools. Intake throttling is clean but again the plug cools. Exhaust throttling keeps the plug hot by keeping heat in and preventing the transfer of cold fuel from the crankcase. When designing an engine especially for exhaust throttling, one has the opportunity of locating the plug in the best practical position for keeping hot and giving consistent part-throttle performance, without losing too much at the top end. The figures show that big prop performance is superior on the radio engine, while the combat engine keeps going up as the prop gets smaller.

The radio port setup runs out of breath over about 12,500. The fortunate thing here is that the means of gaining torque for big props also limits the tendency to overrev in dives. Having both types of engine to play with, gave us the opportunity to swap heads and see the effect of exhaust throttling on a conventional plug location, and then swap piston and cylinder liner assemblies to see what the throttle unit did to the combat power. The conclusions are perhaps surprising, inasmuch as the throttle unit takes very little power away from the combat engine despite the fact that the full open throttle area is less than half the area of the exhaust port., However, the combat engine would not run as well at part throttle and showed a tendency to load up and then hunt. The radio head helped a little here, but the real improvement came from the radio liner with its different port timing. In the air the behavior well may be different because temperature is the governing factor with part-throttle glow plugging. With a cool slipstream the head design must make a considerable difference and

(*Continued on page* 50)

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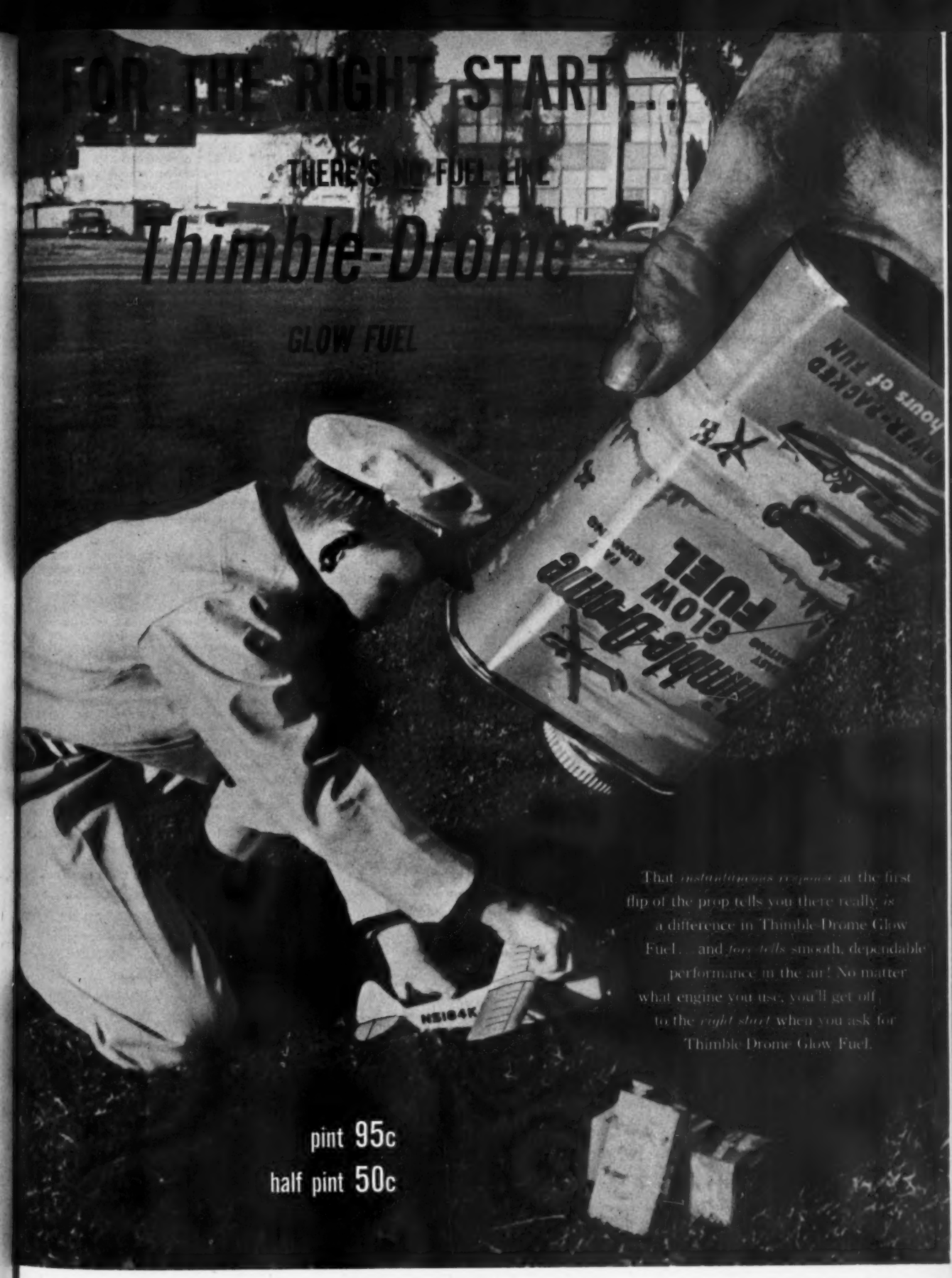
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the aim behind the radio head seems to be to keep the plug element well clear of the cool charge blasting out of the bypass ports.

One assumes that gas flow from the bypass focuses about the center of the combustion chamber, and therefore we locate the plug there for maximum power, and even tilt it towards the by-pass in some cases, so that fresh, easily ignitible gas is surrounding the ignition source. Since the glow plug gets its heat partly from the catalytic action of the platinum filament upon the alcohol fuel, and partly from the combustion heat of the previous charge, it follows that as soon as you reduce the amount of charge and the amount of combustion heat, the plug will cool off. The object then must be to take advantage of all the heat available without exposing the element to any cooling influence. The fact that this is accomplished by locating the plug to the rear of the head and by masking it in a deep hole, suggests that the catalytic heating is far less important than the combustion heating, as no mixture is likely to make contact with the filament until compression forces it into the hole just before ignition occurs. This may also have the desirable effect of retarding the ignition during part throttle running. Anyway, whatever the real reason may be, the fact is that the radio Fox with offset plug works very dependably on the bench over a wide speed range.

The construction of the throttle unit is neat and simple, and it is easily operated from any servo or escapement by a longitudinal torque rod. Forty-five degrees of rotation covers the range from full power to engine shut-off, and a lever covering this movement can be used. Since the throttle spindle can be rotated full circle continuously, a reversible drive is not necessary and a cycling rubber driven system can be used with full power and shut-off twice per rev, ninety degrees apart. Half power comes at about twenty-five degrees after full power.

A pressure die-cast body fits over the mouth of the exhaust stack with a raised boss projecting into the stack for location. The gas passage through the body is half the width of the stack and so leaves room on either side for two long screws which pass through the stack into tappings at the extreme corners of the stack where it blends with the cylinder, and so retain the body. Beyond the countersunk screw heads the body is reamed through to receive the throttle spindle which intersects the gas passage. The portion of spindle in the passage is cut away on either side to leave a 1/16" thick blade which is edged on to the flow at full power, and completely blocks the passage and strangles the engine when turned. The spindle is retained by a small snap ring at each side of the body, and has a hole for coupling to the actuator at the rear end.

Elsewhere, the construction of the engine follows recent Fox practice with counterweighted crankshaft, squared shaft port, steel-splined prop driver and the standardized Fox mounting dimensions. The offset cylinder giving symmetrical disposition of the cylinder between the mounting lugs continues, and the intake features indentations for positioning a second spray bar and a restrictor retained by the jet assembly. The Radio engine has a 9/32" restrictor while the Combat runs slightly larger with 5/16.

One of the biggest contributions to small engine progress to be found in the Fox range is the steady improvement and development of the humble needle valve, and yet another step has been made. A threaded needle in a tapped hole must result in a certain amount of waggle if the thread has the necessary clearance to allow it to be turned easily. Even if the thread is on the tight side the long slender needle still projects a long way beyond the support of the thread and so can vibrate. Clicker type setting devices also tend to flex the needle from side to side and upset the progressive transition from one extreme to the other. What has always been needed is an additional support at the tip of the needle, but the necessary passage of fuel past this support has up to now been the big difficulty. By a very tricky example of machining the Fox needles have grown a small knob at the extreme tip. This knob is a good fit in the small bore of the spray bar, and fuel passes it, by means of a flat ground on two sides of the knob. The tapered part of the needle being larger at the fat end than the knob means that fuel regulation and shut-off are accomplished by regulation of the aperture where the small and large bores of the spray bar join, in the usual way. The needle is thus positively supported at both ends and stays adjusted no matter what.

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gines warn the user not to crank a flooded engine. A flooded engine which is locking hydraulically will not crank, but it can be forced over. The fuel will not compress so something else has to give. In this case it will either be the wrist pin bending, or the piston caving in. Most engines show their indignation by a bent conrod.

We mention this because through sheer hamhandedness we bent a pin, and had to resort to some very careful surgery to get it out without more damage. Having bent it straight in a couple of vee blocks it continues to give good service, and there is nothing to be alarmed about. However, the reciprocating parts of Fox engines are made as light as practicable to give top performance, and nothing the engine will do will hurt them. The fault lies in the operator, so these engines must be handled with reasonable care.

There is nothing special to say about starting and running. The improved needle is no different on the bench from other Fox parts which have always been excellent. The improvement will show in small things on the field. The exhaust throttle is simple, reliable and progressive. You turn the rod and the engine slows down. You turn it a bit more and the engine stops. Doing it by hand it seems critical but with the precise motion of an actuator it should be perfect. Pick-up from closed throttle is really excellent and the true value of the system is clearly demonstrated by this faculty. The precise setting for tickover at about 2,000 rpm is really critical and all play in the operating mechanism should be avoided. On the other hand the difference in thrust between 2,000 and 4,000 rpm on a 10 x 8 is not very great, so that it may be that in the air the settings are not as fussy as they seem on the bench.

Test.

Plug: ¼–32 O.K. Long Reach.
Running Time Prior to Test: 30 mins. Combat. 1 hour Radio.
Bore: .800.
Stroke: .700.
Weight: 6.3 ozs. Combat 7 ozs. Radio.

Power Prop	*Combat*	*Radio*
10 x 8	12,050	12,200
10 x 6	12,900	12,600
9 x 8	13,300	12,700
9 x 6	14,300	13,600
8 x 8	14,600	13,700
8 x 6	15,300	
7 x 10½	14,600	
7 x 9	15,200	
7 x 8	15,600	
Top Flite		
10 x 8	11,100	11,300
10 x 6	12,050	12,200
9 x 8	12,400	12,300
9 x 6	13,400	12,800
8 x 8	13,900	13,150
8 x 6	14,600	

Americano

(*Continued from page* 12)

to prevent warps. Next, pin the wing panel, lower side up, to a flat working surface, using a yardstick on edge as a shim between the leading edge and the working surface, and making sure the trailing edge is pinned flush against the working surface. Cement the missing rib in place, and allow to dry thoroughly while pinned down. This is important, since this operation makes a rigid, warp-resistant structure of the wing. Note that the wing-tip is slightly washed out (this is deliberate, and serves to prevent tip-stall). Carve and sand the leading edge and tip to shape, and the panel is complete. Build the opposite wing panel in the same manner.

Next cut each panel in two at the outboard dihedral break, bevel all three dihedral breaks with a sanding block, and butt-join with three inches of dihedral at the outboard breaks and 7¾ inches at the tips. Fill in the bottom of the two inboard bays with firm ¼ sheet to form a rigid seat for the wing platform. Apply several additional coats of cement to all three dihedral joints, and cover the joints with gauze or tough fabric. Sand the wing carefully, cover the bottom with tissue or silk, and the top with tissue, silk, or Silkspan. The original ship has Japanese tissue on the bottom and Silkspan on the top. Apply at least four coats of dope to the wing (top and bottom). Use Aero Gloss rubbing compound or equivalent for a glass-smooth surface.

The horizontal tail is built just like the wing. However, use soft balsa throughout for the tail, and fill in the bottom of the center section with firm 1/16 sheet. Cover and finish the stab like the wing.

Begin fuselage construction by cutting two sides from medium 3/16 sheet balsa. Cement the ¼ square longerons, flush with the upper and lower inside edges of the sides, full length. Next, cut the pylon from ¼ sheet, and sand to airfoil shape. Then, using the pylon as a guide, cut the 3/16 x ¼ filler strips to length. Cement the filler strips to the longerons, and sandwich the pylon between the filler strips. Note that the pylon goes clear through, its bottom flush with the bottom of the fuselage sides.

Next, cut the rudder and sub-rudder from soft ¼ sheet, and sand to airfoil shape. Bring the fuselage sides together at the rear, bevel for a good fit, and cut away enough of the longerons to allow the rudder and sub-rudder to go clear through. Cut the top and bottom planking from medium ¼ sheet, using the top view of the fuselage as a template for both. Thoroughly cement the top and bottom planks on and tack-cement the firewall in position. Next, carve and sand the fuselage to an approximately elliptical cross-section. Cut the firewall loose and install a fuel tank and timer just far enough aft to clear the firewall. Mount the engine to the firewall, using blind mounting nuts (the original ship used an O. S. Max 15, mounted on a K & B type radial mount). Carefully cement the firewall permanently to the fuselage and carve the cowl from balsa blocks. Install the wing and stab platforms and wing-mount pegs. Apply gauze to the firewall-fuselage joint, to the wing-mount pegs, add the fillets at the pylon and the fuselage is ready for final finishing. It is highly recommended that the fuselage be covered with silk, Jap tissue or Silkspan. Apply four to six coats of clear Aero Gloss or butyrate dope, and color dope to suit. For a smooth, glass-like surface, rub the completely doped fuselage with Aero Gloss rubbing compound or its equivalent.

Note that the engine is installed with four degrees downthrust; the author does not agree, for reasons too numerous and too involved to discuss here, with those who believe a modeler should avoid downthrust like the bubonic plague. For now, suffice it to say that one of the very few full-scale airplanes designed to require no change in elevator position with respect to change in power setting, the Ercoupe uses liberal downthrust. For those who really like lead-pipe arguments, the "winning-est" free flight design of recent years (St. Jean's Ramrod) uses very liberal downthrust. (Ercoupe was designed by an ex-modeler and also has right thrust—Editor).

The required weight for FAI competition is approximately 26¾ ounces. The completed model will weigh appreciably less than this. Before test flying, add sufficient

(*Continued on page* 52)

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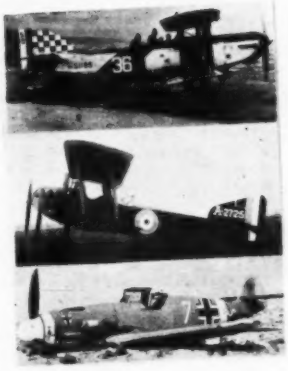

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PAN AM

ballast to bring the model up to weight. This can be added inside the cowl, the fuselage, or center-section of the wing. Carefully position the ballast to obtain the center-of-gravity position required on the plans.

The ship should be trimmed to climb and glide to the right. Add shims between the stab and the stab platform so that when viewed from the rear, wings level, the right-hand stab tip is about one inch higher than the left. Deflect the upper and lower rudder tabs about 3/32 in. to the right. The ship should glide in a gentle right-hand turn.

Correct diving or stalling tendencies by changing tail incidence. First tests should be made with the prop on backwards, and using about a 5-second engine run. Use a prop of 8-inch diameter and a 3½ to 5-inch pitch, depending on your engine. With the prop on backwards, the ship should climb at about a 45-degree angle, somewhat sluggishly, in about a 200-foot diameter right-hand circle. If the ship banks excessively under power, remove deflection from the lower tab, or add deflection to the upper tab, depending on whether the circle is small or large. Transition from power to glide should be relatively smooth.

If the ship stalls badly during transition, try increasing the angle of bank under power by increasing the deflection in the lower tab and decreasing the deflection in the upper tab. When the flight pattern is satisfactory, put the prop on properly and "floorboard" the engine, but keep the engine run very short. By varying the amount of stab tilt and the deflection of both rudder tabs, you will be able to get a steep (about 60 degrees up) climb and smooth transition into a right-hand glide. The original ship will consistently do a little over three minutes in dead air on a 15-second engine run. Write the author in care of the magazine, if there are any questions concerning this ship.

MAN at Work

(*Continued from page* 7)

You'll never throw away a copy! . . . big kick out of Cheminol's description of their new Motorjet scale race car as "disaster proof." Long list of technical improvements sounds as if Harry Rice is competing with General Motors. If you go for cars, this gas-engined job is a dilly . . . always fascinated by tales of free flighting ukies. Why do they fly stably? When free flights, guided missiles, that is, crack up? Should we hang a kite tail on the end of a wing and have fun? Remember one at the Plymouth Internats that got away, handle and all. Flying airliner-steady over near-by woods, its trailing handle snagged a tree, and this stunter went round and round until the gas ran out. Firebaby's are great for this. Ellis Wonser, Downey, Ill. once told us that his boy lost two that way. Nose heavy, lots of torque, but they circle faster and faster until they vanish. What say, you long-haired theory boys? . . . thrust bearings for those little rubber jobs? America's Hobby Center said sure, when checked, but only 20,000 left! . . . letters remind us that control line fliers should stay away from power lines. So obvious, it sounds ridiculous, yet people have been killed that way, usually adults who warn the kids and don't practice what they preach. The model does not have to contact the power lines—high voltage current will jump sizable air gaps and, besides, who stays in the middle of a circle when the wind blows!

• • •

► "If the dealer who pushes model airplanes is off his rocker," states Dick Schwarzchild (Dick's Hobby and Toy Center, Wilkes-Barre, Pa.), "then someone has lost his marbles. We do a sizable business in plastics, but it doesn't come close to our airplane business. In the first year that the Babe Bee was out, we went through 24 cards, or 144 motors. This does not include Torps, Cubs, Foxes, etc. Just to equal the Babe Bees alone, we'd have to sell 576 98-cent plastics. It takes 20 such kits to equal one Fox Combat. And fuel, props, plugs, etc. go with Combat. We must, of course, cater to all possible trade . . . should the American model airplane industry get behind the international teams who have such trouble getting to Europe? Says Tony Alvarado, Cuba, "Unless the US modelers perk up, nobody outside God's country will believe those National records as whenever they (the modelers) go abroad to fly—with the exception of Cranfield in '53—nothing has happened. National complacency?" International Models has an interesting clockwork timer for free flight models. Weighs 45/100 ounces, times from 0 to 20 secs. . . . Vancouver Gas Model Club (Canada) has novel "33-1/3" free flight event. You get one-third points for construction, another third for finish, and final third for flying. Still think they should require free flights to make one flight to right, another to left. Separates the men from the boys, the missiles from the planes. Should make a good club event. Oh, well, today's free flighter doesn't know how to design anything so elementary as an airplane that can turn both ways, like an airplane should.

Put a Fin in Front

(*Continued from page* 29)

The large arrow in Figure 2 indicates a retention of this desirable effect in the "forward fin." The corrective vertical side area is maintained *above* the thrust line where it assists dihedral action. The usual high thrust line model does not have this added dihedral effect; some writers say that a deep belly or pylon area below the thrust line counteracts or detracts from dihedral action. The lateral instability of some high-thrust designs lends support to this idea.

The forward fin provides improved spiral stability. Here the forward fin comes into its own. A scientific monograph by R. Annenberg of England, not yet available in this country, discusses the effect of forward fin area above and in front of the center of gravity to "damp yaw in front of the C.G.". Torque effects of modern motors need this type of compensation not provided by dihedral. As a model's nose veers to the side and down, pressure is exerted on the side of the fin toward which the model is turning. This forces the model's nose back to the desired flight path. Few modelers have realized that this problem is different from a simple sideslip which dihedral corrects. Providing this long-needed security against spiral dives enables a high-performance gas model to fly safely and handle easily.

The forward fin makes a model less critical to rudder effect and adjustment. Providing a safety factor of directional stability at the model's nose leaves less corrective work for the rudder. By the same token, more rudder offset may be used without danger of spinning in. Particularly under power, the model may spiral without danger and glide circle may be tighter than with the conventional model lacking the fin.

The forward fin premits use of a force layout achieving maximum longitudinal stability under all conditions. The advantages mentioned above permit the motor of

(*Continued on page* 54)

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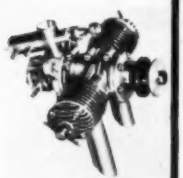

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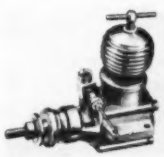

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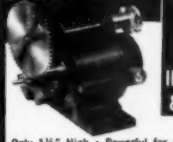

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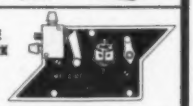

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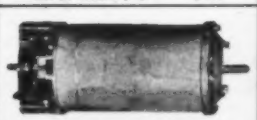

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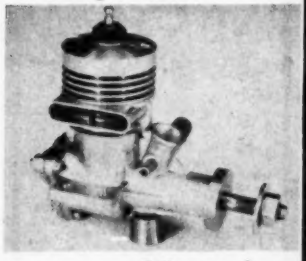

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the power model to be mounted in line with or above the wing. This arrangement is the best possible to achieve longitudinal stability.

The weights and forces of the model are concentrated. In early gas models, it was contended that a center of gravity suspended below the wing was a good stabilizing influence. In the modern free-flight, however, terrific speed under power has brought new probelms. Weights of component parts of the model no longer exert sufficient stabilizing influences. The *pressures* induced by high speeds become more important under power than component weights. This is why the pylon model which glides and flies well under low power loops so violently under high power.

Figure 3 shows the two most important forces which operate on a fast moving model—thrust (TL or thrust line) and drag (CD or center of drag). The drag of the high wing on the pylon model causes the nose to come up more and more as speed increases. Similarly, the thrust pulling below the center of gravity adds to the nose-up moment. Neither of these forces operate when the thrust line is high, allowing a concentration of weights and forces. Thrust pulls directly in line with drag and the CG so that no strong de-stabilizing moments develop. The looping tendencies just described are eliminated (again assuming proper incidence angles of wing and stabilizer).

A second value in weight and force concentration is the effect upon transition of the model from powered flight to glide. If center of drag is near the thrust line, the sudden loss of thrust when the engine stops will not induce pitching movements which require a dive and loss of altitude to regain flying speed and stable flight. The fast moving model with weight and forces concentrated tends to fly "out over the top" from climb into glide.

High speed flight with greater incidence differences between wing and stabilizer is possible. For years gas model fliers have complained that the 1° to 2° difference of incidence used in fast pylon designs made them tricky and even dangerous to fly. Greater incidences helpful to stability in a slow-moving, gliding model become disastrous at high speeds because of the increased pressure upon its surfaces giving looping tendencies. The high thrust line counteracts this effect, and the forward fin permits us to go "high-thrust" and double the incidence difference. This brings three advantages of sufficient decalage. The model is "tamer" to adjust and safer to fly. Transition from climb to glide is quicker, without altitude loss. Longitudinal stability, both in climb and glide, is enhanced.

It is a well known fact that all three types of stability discussed here are intimately related, so that the improved lateral and spiral stability brought by the forward fin improves longitudinal stability as well.

How Good Are the "Red" Engines?

(*Continued from page* 11)

is of the semi-slipper type with two low-pressure rings, only 1/32-in. wide but giving exceptionally good piston seal. It has three massive rectangular skirt ports, 5/16-in. deep by ¼-in. wide, (which register with similar ports in the liner) and a curved deflector crown. A full-floating 5 mm tubular wrist pin with aluminum end pads is used, to which the piston bosses and drop-forged alloy rod are faultlessly fitted.

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(*Continued on page* 56)

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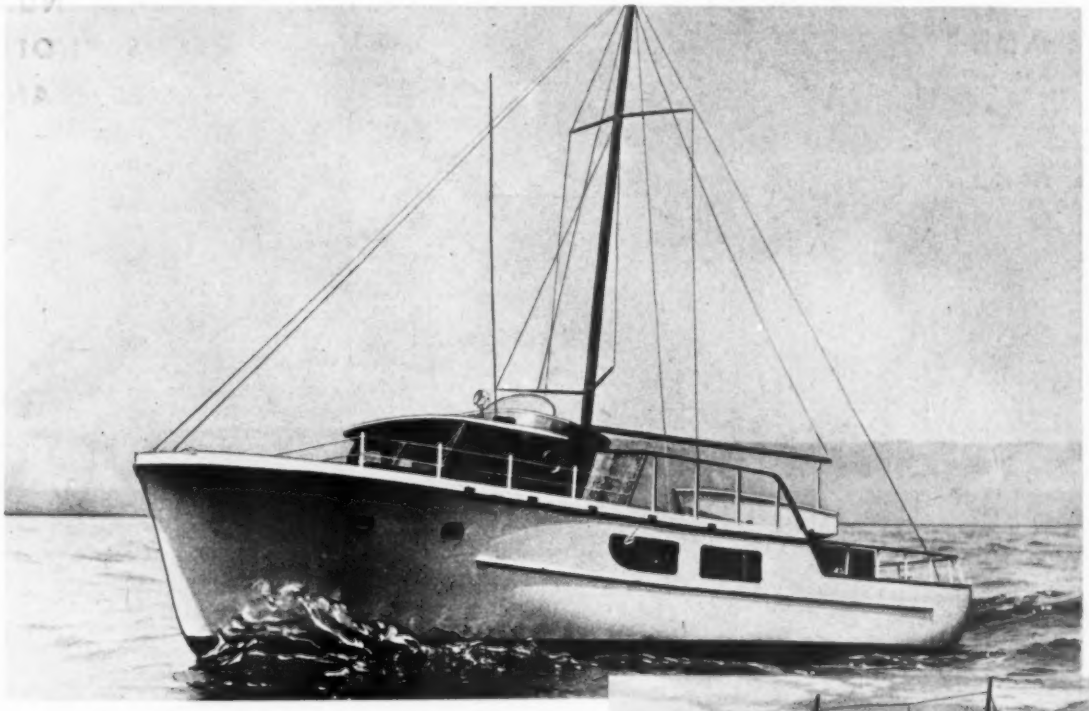

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component, consisting of shaft, disk-type web and tubular crankpin, with the addition of a lead balance weight. This latter, combined with the very light piston assembly, results in an unusual degree of counter-balance. In many European engines (diesels especially) a completely unbalanced shaft is used and usual Western practice, where counterbalancing is employed, is either to balance the shaft (i.e. crankpin) only, or crankpin plus half the connecting rod weight. The Vltavan counterweight, in contrast, balances the entire rod plus part of the piston weight, yet runs with commendable smoothness. The shaft is supported in two ball journal bearings of 8 mm (inner) and 6 mm (outer) inside diameter, in a rigid machined alloy housing, attached to the main casting in the usual way by means of a flange and four screws. The prop drive hub is secured to the shaft with a split tapered collet and its rear rim fits snugly within the nose of the bearing housing, protecting the front bearing from dirt and grit.

No gaskets are used by the Vltavan-5, all joints being metal-to-metal. The cylinder head, which is an extremely clean diecasting with internal contours to match the piston crown, has the plug offset to the bypass side and is secured to the case with six screws. Incidentally, the plug hole is tapped 6mm Metric thread and will not, therefore, accept standard "Western" glow-plugs.

Our test of the Vltavan confirmed the messages that we had received from Czech correspondents warning us not to expect an output equalling that of the MVVS tool-room originals. On the torque-reaction dynamometer, a maximum torque of .21 lb. ft. was achieved at 12,000 rpm, equivalent to a brake mean effective pressure of 54 lb./sq. in., and the peak of the power curve was realized at 15,000 where a figure of .54 brake horsepower was indicated. Air temperature was 75 deg. F. and a nitro content of 25% was used in the fuel. Although this can probably be improved upon under favorable conditions with more nitro, it would still fall short of the performance of the Dooling 29 and Fox 29R.

In all despects, however, the Vltavan was a very pleasant handling engine, quite remarkably easy starting and, as previously mentioned, smooth running. The motor has a displacement of .295 cu. in. derived from a bore and stroke of .787 x .606 in. and weighs 7.3 oz.

The Alag X-3

The Alag X-3 is a .15 cu. in. Diesel from Hungary and is unique inasmuch as it is the only engine from behind the Iron Curtain to be successfully exported to a major engine-producing Western country: namely, Great Britain. The engine follows a fairly familiar European basic pattern, first made popular by the English Elfin Diesel in 1948/50 which, in turn had been inspired by the American Arden .099 and .199 then at the height of their fame.

The motor is built around a pressure-cast alloy case and bronze-bushed bearing unit. The crankshaft, which appears to be of an unhardened chrome-alloy steel, has a .334-in. dia. (8.5 mm) journal and a small valve port giving a 145-degree induction period. The shaft has a machined-in crescent counter-balance which, however, does not completely balance the heavy crankpin. A machined dural rod couples the shaft to a fairly heavy piston with pressed-in wrist pin and conical top.

The reverse-flow scavenged cylinder screws into the case and features a variation of the Arden type radial porting similar to that seen on the West German Webra Mach-I. This involves three exhaust slits in 360-degree formation and six large volume internal bypass flutes. The

cylinder is topped by a screw-on alloy cooling barrel and the usual compression adjusting screw. A spraybar type needle-valve assembly is fitted and, supplied with the motor, are two interchangeable molded plastic venturi inserts. The screw-in back-plate is also a plastic molding, which takes the X-3 out of the rut, but with no very good reason since this reduces the mass available for heat dispersal.

On test, the X-3 delivered a horsepower output of .235 at 13,600 rpm., which is in accordance with the expected levels for engines of similar type. Some difficulty was experienced with the compression control, the contra-piston tending to freeze in the bore as soon as the cylinder was hot and thus prevent further adjustment. This same trouble has been experienced with two other Hungarian engines sampled and we were informed by the Hungarian export agents that this trend is not considered a fault by Hungarian modelers, who learn to pre-set the compression at the critical level. We do not, however, regard this as a satisfactory substitute for the ability to adjust for maximum performance after the engine has warmed up, and we understand that X-3's now exported are modified accordingly.

The Alag X-3 has a bore and stroke of .591 x .551-in., giving a swept volume of .151 cu. in. Weight is 4.2 oz.

The Schlosser 2.5

Of the dozen East European engines that have passed through our hands in the last two years, the East German Schlosser stands out as being by far the most perfectly finished. In this respect it will, in fact, bear comparison with some of the best that we, in the West, have to offer. The shaft, for example, is ground all over and the fit and alignment of the conrod bearings are beyond criticism.

The general design and structural layout of the Schlosser is practically identical with that of the Alag just described, and it has exactly the same cylinder design. However, it has a plain disk-web (unbalanced) shaft and an unbushed main bearing, (which, nevertheless, is exceedingly well finished) and its stroke/bore ratio is lower, resulting in a slightly lower cylinder height. An oval admission port is used and a slightly longer induction period. The shaft journal is .315-in. dia. (8 mm). An unusual departure is the method of retaining the prop, which is by means of a special C/S head steel bolt and dural front washer, the periphery of the latter being threaded to take a turned hollow spinner.

The Schlosser started and handled well and delivered a maximum output of just .24 bhp at approximately 14,000 rpm. It has a bore and stroke of .602 x .520 in. and a displacement of .147 cu. in. It weighs 3.8 oz.

The MK-12S Diesel

This is the best-known Russian .15 cu. in. motor. Designwise, it is basically similar to the British E.D.246 insofar as it uses E.D. type cylinder porting comprising radial slits and a 360-degree bypass, induction via a rear intake and disk rotary valve, and a crankshaft supported in twin bearings. This suggests a more advanced design by comparison with the Alag and Schlosser, but, in both workmanship and performance, it falls short of the standards set by these two engines.

The base of the engine is an aluminum casting with a separate cast bearing housing attached with four screws. In the back of the case, the valve disk is retained by a pin screwed into the casting, and having a bifurcated end as a means of locking it. This appears to be one of the shortcomings of the design and when, on test, we pushed rpm above 10,000, the pin came loose. The

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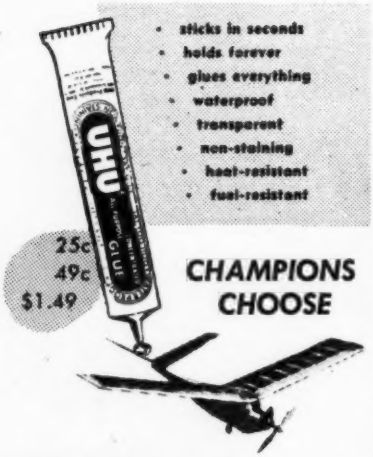

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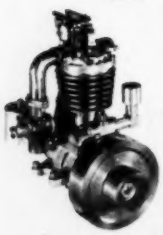

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cylinder liner is hardened and reasonably well finished. It is secured by means of a machined aluminum cooling barrel which drops over the liner and screws onto the upper part of the crankcase. The piston is unhardened with a pressed-in wrist-pin.

As regards performance, the MK-12S started easily and ran well on the larger prop sizes holding rpm to 9,000 or less. Due to the difficulty experienced with the valve pin, the top end of the power curve could not be double-checked but from initial readings obtained an output of approximately .22 bhp at 12,000 rpm was determined.

The MK-12S has a bore and stroke of .591 x .551-in. giving a displacement of .151 cu. in. Weight is 5.25 oz.

Radio Control News

(*Continued from page 25*)

capement and is powered by a McCoy .049 glo engine. Spanning six feet, the model weighs 34 ounces and features a quick adjust rudder movement, more winds, more rudder. Other models by Mr. Northrop include a Gimlet (MAN) at 26 ounces and a semi-scale Great Lakes Trainer with a Varicomp and a Mighty Midget motor on kick-up elevator. The Fox .19 produces realistic loafing flights.

• • •

Lt. John D. Woods, 54th F.I.S., Ellsworth AFB, Rapid City, S.D., reports on RC activity in the Badlands' area. There are about eight from the fighter squadron who are active fliers, plus about six or seven civilian RC fliers.

The Lt. built the Westwind (March '58 MAN) and added a few modifications such as a spinner, a dorsal fin, a wire gear with a wider tread and an open cockpit. The model shaped up into quite a snappy fighter type plane but again we were unable to use most small snapshots for magazine reproduction.

• • •

Eric McLuhan, 29 Wells Hill Ave., Toronto, Ontario, reports that the RC'er in that area are looking for RC gliders or delta-wing jobs. Also, they want a reliable single-channel scale job for .15 or .19 engines. In the meantime, Eric has a Sea-Cat with an ED 2.46 diesel and a Rudderbug with a McCoy 19. An ECC Telecommander receiver can be plugged into either plane and transmitter used is the Aristrol MOPA.

• • •

Some time ago we mentioned a Crash Clinic being organized by the Larks. The first session shows that 50% of the crashes are due to pilot error. Other break-downs include 18% structural failure (wing folded etc.), 20 to 25% interference which is particularly bad in the Los Angeles area, and fly-aways at 20%. All items together under Equipment Failure, accounted for 50%. It was determined that the two biggest causes of RC crashes are radio equipment and the "nut" that holds the transmitter key.

Also from the Larks comes old-timer Webb Hill's recommendation for a long-life plane. Use lots of diagonal bracing; rock hard balsa for longerons (tough to come by now-a-days) and at least three to four coats of cement per joint. Webb should know, since he is still sporting an RC glider built in 1938.

This group had an unusual get-to-gether or contest at a June meeting at which Webb took first place with his oldest RC plane, which still used original installation Edison batteries. Ken Willard showed his 'Indoor RC.'

• • •

Surprising how many fliers go out and just fly around with no real thought being given to maneuvers. Fig. 3. shows the Precision Pattern. Why wait until a week or a month before a contest to see if you can fly this pattern. From the publicity given this pattern in the west coast club papers, we'll venture to say that practically every transmitter and/or toolbox has a copy attached in full view.

• • •

With all the nationwide interest in promoting scientific endeavors among high school students, it is gratifying to learn through the DC/RC Newsletter that Fred Warnock of Bethesda, Md., won first place in Electronics at the Bethesda-Chevy Chase High School annual science fair and third place at the Montgomery County Annual Science Fair. The project, Radio Control of Model Aircraft, was presented with plenty of diagrams. This is something for other RC builder/students to shoot for.

• • •

Last year we announced that Mr. Donald Sump of Sheridan, Wyo. would put on a big steak dinner for all RCers who came to fly over the Memorial Day weekend. One lone purple steak eater arrived. However, this year produced 21 fliers and an additional bill for 15 steaks. All flying was with single channel, rudder-only, escapement operated. Most of the planes were of the Live Wire series and MAN published plans, such as Gramps, Breathless, Triple Threat and others. Mr. Sump promises an even better event for next Memorial Day so all RC fliers in Wyoming, Montana, and surrounding territory have something to look forward to.

• • •

The Modulator, Pioneer Radio Controllers of Palo Alto, Calif. reports that at a contest in Sacramento in June, Multi-channel equipment was practically all Orbit-8 with Dunham, Deans and Bonner (LARKS)

(*Continued on page 61*)

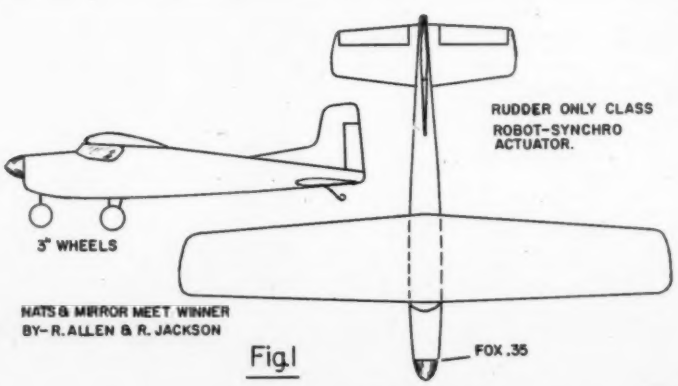

Fig. 1

Guillow's 1914-1918 WAR BIRDS

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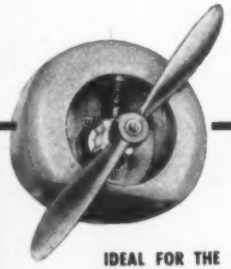

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51. AMERICANO: .15 FF, by Blanchard.
BOMARC: Scale, Jetex, missile.
CUTLASS: Sport U/C, .049's.
Scorpion power makes Bomarc terrific flier. Americano is National Champ's very latest.

1. GIMLET: RC Low wing .049.
ROYONO: Contest FF A&B.
So low wings RC are new? Gimlet started it all!

2. COMPER SWIFT: ½A, FF, Scale.
MULVIHILL WINNER: Rubber.
THE LIEUTENANT: UC Stunt, .29-.35.
If it's scale you like, the Swift is a wonder!

3. BUSTER: Rubber, Sport
THIRTEEN: UC Stunt, .29-.35.
VOUGHT SBU-2: UC, Scale, .19-.29.
Buster. Ideal for beginners on way up.

4. SURE FUN: UC Sport, .29-.35
PROFILE SILVAIRE: FF Profile, ½A.
ZEPHYR: Rubber, Fuselage
Control line on floats. Sport Gassie.

6. HIGGINS CABIN CRUISER: RC Boat, .09-.19.
FOKKER D7: Scale, U/C, .29-.51.
The great all-time favorite? Try the Fokker D-7.

7. WORLD CHAMP GL.: Nordic Winner.
HI BOY: Cabin Stunt, Palmer-Goyet, .29-.35
POW WOW: Bob Palmer stunt, .29-.35
Collector's item—two Palmer models!

8. GEE BEE: Scale U/C, .19-.25.
DRAKE: FF, flying boat, .049.
DURANITA: FF, bipe, .049.
More people built the Drake than any other ship.

11. GAMBLER: Mirror Stunt Winner, .29-.35.
DOUGLAS B-66: ducted fan FF, .049.
B-66, the ducted fan job that beats all others.

12. WHIRLING WINGS: Sikorsky XH-5, .15, 'copter.
BREEZY: Small field RC, .049.
SPITFIRE: Stunt, semi-scale, .29-.35.
P. Schoenky, 'copter master-his Sikorsky!

13. T-CRAFT: FF scale, .049.
FENO: Combat, stunt, .29-35.
PADDY'S WAGON: Contest FF, .049.
Paddy's Wagon—one contest job ok for beginner.

14. HEATH PARASOL: RC, FF, Scale, .075 .09.
GUARDIAN: Nats carrier winner, .29's.
SHARPIE: FF Sport, .02-.049.
—Guardian a dilly.

15. RE-8: WW1, U/C. .29-.35.
FLAPPING WINGS: Rubber, ornithopter.
BOOMER: FF, sport, pusher, .049.
Can planes fly like birds? Ornithopter sure does.

16. DRAGGIN: U/C Stunt .049.
BLACKBURN: 1912 Scale FF .049.
ASCENDER: Contest FF .049.
Wind in the wires. Goggles. Oh, that Blackburn.

18. PAACKHORSE: PAA Load FF .15.
AIRNOCKER: Scale, FF .049.
What model hit the jackpot? Airknocker—the Champ.

21. FAST MILER: U/C Proto, .29.
PEE WEE PAL: .02 FF sport.
THE VICTOR: RC, RUD., .15-.19.
The Proto Racer is tops; 1200 flights on Victor.

27. FLAMINGO: RC Amphibion, .15-.23.
UPSTART: Best B-C FF, on .29-.35.
NACA planing hull make Flamingo stand-out RC. UPstart—it goes!

40. MUSTANG: U/C Scale, .29.
BI-GONE: Sport, FF, ½A.
GLIDERS FIVE: HL Sheet.
Mustang, Jim McCroskey's Nats winner. Bi-Gone, nifty bipe.

42. TENDERFOOT: 1/2A, FF, beginner
BIG D: FF, delta, .049-.15.
WESTWIND: RC, 1/2A, low wing.
Three stand-outs—good but different!

43. EQUALIZER: .15 to .19 multi, RC.
QUICKIE TRAINER: Speed, .29.
AMAZOOM: FF, contest, .15.
deBolt's best, the Equalizer? Amazoom—Stan Hill's hi-thrust.

44. CONVAIR'S DELTA: Jetex FF.
LIL DYNAMITE: .15 stunt, UC.
SWAT: ½A, FF, contest.
A trio of exceptional planes.

45. ASTRO-HOG: Multi RC, .29-.35
MITCHELL: Profile, .09's, .15's UC.
Dunn's low wing radio—tops! Nothing matches this multi. The Mitchell a fine flier.

47. FOKKER E-3: 1/2A, FF, Scale.
NAVY RACER: Rubber, semi-scale.
WOODY: .29-.35, UC Combat. Hot!
E-3, beautiful model, fine flier.

48. SPORTCOUPE: .09, U/C, Stunt.
WHATIZIT: .35, Combat, Wooten.
SWIF-F-FT: Jetex, two sizes!
Whatizit, settles fuse-wing debate!

49. CONQUISTADOR: .29-.35, U/C Stunt.
TWO-STAGE ROCKET: Jetex (2).
Stunter is a thing of beauty, and it flies as well as it looks!

50. DUMBO: PBY Scale, U/C, .19's.
FRENCH OLDTIMER: 1914, ½A, FF.
Dumbo, the Catalina, man-sized ukie, takes off, lands on water or ground.

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24. Aero Bat, Snoopy, Seagull
26. Corsair, Gyro-Glider, Santanita
29. Cougar, '55 Nordic Winner, Dizzy Boy
30. Great Lakes Trainer, Triple Threat RC
32. Mig-15, Fifinella, Coquette
33. Skyraider, Dunwoody's Nordic, Flexi-Bull-It
34. Corben Super Ace, Cessna 310, Profile Lightning
38. SE-5, Curtiss Robin, Nobody

taking the first three places in Multi expert class. The PRC group, as with other west coast clubs, put in a 200 x 300 foot tarmac for take-offs and landings. This is an excellent club project and all it takes is permission to do this on someone elses land. We've heard of only a few such cases in the east.

• • •

At the 6th Annual Radio Control Roundup, sponsored by the Southeastern Virginia RC Group, and held at Langley Field in June, we found statistics which reflect the amount of activity. Total flights for two days, were 26, compared to 169 last year. Total flying time 20 hours and 22 minutes as against 17 hours last year. Walt Good racked up the most flights, 15. Jim Baggett thrilled the crowd with low-level aerobatics and H. G. McEntee had the smallest RC model, an 8-oz Goodyear racer type.

• • •

From the San Leandro Channel Masters we picked up the Preflight Check List that is being used by most west coast fliers. Every large-scale aircraft has a check list which the pilot must go through prior to take-off. Why not the same for a $200.00 model? Here it is: 1. Battery Voltage—A, B and servos; 2. Aircraft Inspection—inspect fuselage and all surfaces for warps, breaks etc.; 3. Equipment Installation—check and secure all plugs, connections, servos, keepers, escapements, fuel system and engine; 4. Assembled Aircraft—check alignment of wing, stab. bands, controls (neutral); 5. Turn up Engine—check throttle speeds and all controls.

Here is the range? Do not fly until check is complete. When not flying cover wing and stab bands and engine to protect from sun.

NEW ITEMS

Last month we mentioned the new all plastic Babcock Tri-Pacer. While it has not reached the market at the time of writing, it has stirred interest. Babcock has a new catalog listing almost 20 items. This catalog has a Radio Control System Chart, invaluable to the novice.

• • •

Lafayette Radio, 165-08 Liberty Avenue, Jamaica 33, N.Y. announces an 18 in. RC cabin cruiser, which assembled and ready to run, with an electric motor drive, cruises at about 3 mph. It comes in two combinations. Set F354 consists of boat and motor, servo, receiver and transmitter (less batteries) and sells for $42.50. Set F350 consists of the boat with motor and servo and sells for $22.50.

• • •

One of the accessories that has kept us from developing creaking joints and an aching back is our Broadfield RC Field Box. Broadfield Air Models, Ashland, Mass., now has three models of this field kit, which measures 7" x 12" x 21" when folded. Ground-gripper stakes are now included to prevent tipping over in a high wind. Decals, nickle-plated hardware, cement and all parts cut to size are but some of the contents of the field box kit. Prices range from $10.95 to $11.95 for the kit and an additional $7.00 for the assembled box.

• • •

Ace Radio Control, Higginsville, Mo., offers several items of special interest to the designer. Transformers (about 9/16" square), for transistor work, the CR60 model, with an input to output impedance of 20,000 to 1,000 can be purchased for $1.63. New GEM relay, ER type, is the same size and weight as the standard model but has a different spring arrangement on the armature. Factory set to pull in at 3.5ma and drop out at 1ma, the 5000-ohm

HERE IT IS!

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Many pages of advertising "poop" could not tell the story of the "FABULOUS" ESSCO THT receiver. Hundreds of unsolicited letters from users all over the world testify to its fantastic flight proved reliability. The ESSCO THT is the only receiver on the market today that has checked out OK to reliably perform for 10-12-15 hour world endurance flight attempts!!! You may never go after these extended records but you certainly can use a receiver that, when installed in your model allows you to forget all about radio problems. The STD Essco THT is supplied with either the MICRO GEM or the new paladium contact RBM. (Ideal for proportional control work). Supplied with sandwich type assembly or with crash proof aluminum case. State preference with order, either type $21.95
SPECIAL MODEL for reliable 50-54 mc operation 23.95

Experienced modelers will agree that the most popular RC single channel receiver during the past 6-7 years has been the LORENZ 2 tuber. We believe that more modelers started in RC and clocked more hours of trouble-free flights with the ESSCO LORENZ than with all other Lorenz type sets combined. The beginner RCer cannot do better than to start in RC work by using the super value ESSCO ECON-LORENZ receiver. The special low price is not a true indication of its extreme value. The material used in this special set is equal to and probably superior to that used in sets selling for a much higher price. Purchase a set on a 10 day money-back guarantee and see for yourself. You will wonder how any American mfr. could put out such superior quality at such a low price. THE STD ESSCO ECON-LORENZ in UNI-Mt assembly 15.95
DELUXE MODEL with aluminum crash case & min-pot 17.95
Both models supplied with std GEM or RBM relay. Standard model kit $10.95; DELUXE MODEL.. 12.95
Kits complete with all parts & tubes, no extras req. Looking for a more reliable relay for proportional or regular escapement work? Essco has it for you .... Features paladium non-pitting X-BAR contacts. (See Ed Lorenz' column in July MAN pgs. 18-19*). Ultra sturdy coil and solder lug construction. Small 1 oz. wt. Convert your dual proportional etc. receivers and obtain trouble-proof performance. 5000 ohm 3.75
Simultaneous proportional elevator and rudder control by means of the G/G method is due to become more popular with the RCers with the "lean" budget. John Worth's articles in July-Aug-Sept MAN should be followed for a well written discussion of this tried and proved method of "life like" model flying. For several years the ESSCO MINI-PULSER (non stick type) has been the industry's best buy. An improved model of the MINI-PULSER with stick controls is now ready at only 26.95
The deluxe build-it-yourself kit 19.95
Top Quality parts to build WORTH unit at best prices
For the Modeler with the "lean" budget the up to now average $250-$300 investment for multi-channel work must remain a dream. Understandably dual simul 8-10 channel is costly but, ESSCO always known for bringing high quality RC at low costs has cracked this problem .... Now available a TOP QUALITY DUAL SIMULtaneous 6 chan. XMTR that will operate all presently mfrd. read receivers. Features ground case or hand held operation with remote control stick box. Powered by heavy duty regulated power pack & battery. The finest components available are used exclusively, and assures years of trouble-proof & non-piddling operation. Unique transformer coupled multi-stage circuitry in audio and RF units never before supplied for RC work. ABSOLUTELY, COMPLETELY RELIABLE. Model D88XP complete with power supply $104.95
Model D88XB complete XMTR for dry battery operation 84.95

COMING SOON COMPANION RECEIVER AT STARTLING PRICE

WHAT'S NEW IN TRANSMITTERS? Esseo as always first with the latest in RC developments. A special Essco MOPA XMTR for 27 or 50-54 mc operation. Features built-in H.D. power pack and rechargeable cell. Unique shoulder strap camera case type leaves both hands free. Can also be used as ground case job. Self contained FRM for optimum output. The RC industry's top value in transmitters $39.95. Special 50-54 mc model 44.95

FIRST TIME AVAILABLE, exclusive with ESSCO, the long awaited power supply for the WAG TTPW XMTR. Reliable, "CLEAN" A & B power from a rechargeable H.D. Cell. Simple to install in place of your present dry batteries. Comes complete with built-in charger for the power unit cell and will also recharge C-G, Yardney cells etc. Costs less than 2 sets of dry batteries, only 34.95
Going broke buying replacement batteries for your multi-channel XMTRs? The solution: an Esseo H.D. power pack. Shoulder pack carried that easily connects to your present XMTR with little effort. No holes to drill, you simply lengthen present battery cable leads and plug into power unit. The included 40 amp cell will power XMTR for 2-4 weekends without requiring recharge, only 29.95

WILLARD ER40-2, a compact 2 volt 40 amp cell to power your XMTRs etc. Only 2¼x6¼x4¼H. Will replace the now non-available BB54A units and will fit most XMTRs. Comes with electrolite filler and complete instructions for filling and charging. Get a couple while available at the special low price. 5.95
Dejur high grade precision 0-500 micro-ameter. Ideal for multi-tester and sens. FRM, with 0-5 ma shunt 6.95
Reliable Operation of reed receivers requires the use of stable audio tone modulators. Many RC XMTRs now used can usually be used for reed operation by use of a stable modulator. The ESSCO MULTI-TONE Modulator allows you to go multi without having to purchase new XMTR gear. Modern design, stable non-drift tones obtained by use of HI Q inductor with efficient transformer coupling. Complete modulator for 3/5 channels ready for use in your present equipment. 24.95

ESSCO - NEW YORK
58 WALKER STREET
NEW YORK 13, N. Y.
Telephone WA 5-8167

BUY ESSCO RC PRODUCTS
at your local dealer
PROMPT-FRIENDLY SERVICE
Complete satisfaction in RC

If not available at your local shop order direct from listed dealers or New York office for FAST SERVICE. Incl. postage & obtain FREE BONUS.

Alaska, Fairbanks—"Servicing the Far North"
HOBBY HOUSE, 120 Lacey Street

California, Los Angeles
COLONEL BOB'S ,3707½ West Pico Blvd.

California, North Sacramento
C & M HOBBY SHOP, 1613 Del Paso Blvd.

Connecticut, Bridgeport
FRED'S VARIETY STORE, 1743 E. Main Street

Cnnneeticut, Danbury
HOEBY HOUSE, 276 Main Street

Connecticut, Darien
TOBY'S HOBBC CENTER, 1032 Post Road

Delaware, Dover—"Gateway to the World"
MACK'S HOBBY CENTER, 30 Louckerman Street

Florida, Miami—"Fast Service to the South"
ORANGE BLOSSOM HOBBIES, 1896 N.W. 36th St.

Florida, Fort Lauderdale
STAR HOBBIES, 1000½ East Las Olas Blvd.

Louisiana, New Orleans
HUB APPLIANCE & HOBBIES, 2618 S. Broad St.

Michigan, Detroit
JOE'S HOBBY CENTER, 9810 Wyoming Avenue

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OLSON & CLARK HOBBY CENTER, 6113 Maple St.

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BOB'S MODEL SHOP, 5023 N.E. Union Avenue

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line

Leaders in Authentic

Plastic Construction Kits

LINDBERG PRODUCTS, INC.
SKOKIE ILL.

NEW from PERFECT

Ready-To-Use GLO-KLIP BATTERY SET

60c
Completely assembled and soldered
Glo-Klip Solderless Connector..... 39c

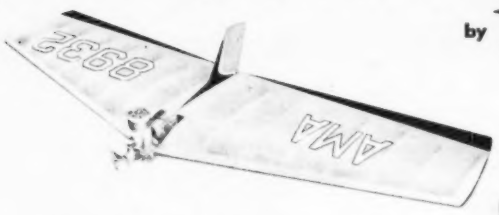
Also Look For Perfect Fuel Line
Fuel Tanks, Fuel Pumps, Wheels, Parts

FANTASTIC NEW

COMBAT DESIGNS

for the "fight flights" of the century...

by Berkeley



The Worthy New Tailless Opponent:

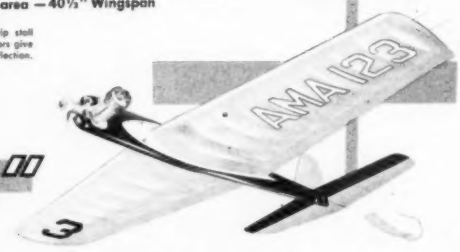
"ORBIT ACE"

$3.50

Kit No. 13-3

For .19 to .35 Engines — 425 sq. in. area — 40½" Wingspan

Tip elevators wash-out to prevent tip stall in sharp maneuvers. Balanced elevators give maximum effectiveness at high deflection.



"LANCER"

For the Combat Keen flyer, the "Lancer" is the answer!

For .19 to .35 Engines — 39½" Wingspan

Designed by Arthur Pawlaski and flown by him to win first place at the 1957 Nationals. Pawlaski used a Fox engine in his winning model. The design was considered by "Duke" Fox as outstanding, and given his personal recommendation.

BERKELEY MODELS INC.

WEST HEMPSTEAD, NEW YORK, U.S.A.

$3.50

Kit No. 13-4

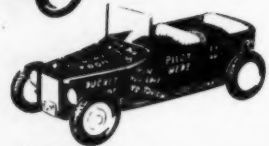
ACE

With easy to shape and finish Balsa wood Ace kit parts you can turn out a collection of models as beautifully detailed and professional as your skill permits. Ideal, too, for novice experience. Either way, you'll be proud you built them!

17 Ace Models

PICK-UP 60c

"T" ROD 60c



JALOPY 60c

HOT ROD $1.00

If no local dealer is convenient, send check or M.O. Include 10c per kit for packing and mailing. No C.O.D. please.

ACE PRODUCTS 60 N. San Gabriel Blvd. Pasadena 8, Calif.

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model will sell for $2.50 or less.

• • •

The first all transistorized receiver in kit form, now marketed by ACE, model TR-4.5, is said to have a temperature range from 15 to 130 degrees and ground range in excess of 3,000 feet. One prototype model measured ⅝" x 1⅜" x 1⅞" with the weight being between 1½ and 1¾ ounces. The CG Voltabloc cells are ideal for this receiver, which draws 10 ma on idle, 2 to 3ma upon receipt of a carrier, and jumps to 40ma upon receipt of a 400-500 cps tone.

• • •

With the success of the Simpl-Simul system, as presented in MAN by John Worth, many builders will be trying this in the near future. Ace has a kit for the pulser (July '58, MAN) for $21.95. All brackets and case are punched, components are matched and top quality parts are used throughout.

• • •

ESSCO, 58 Walker Street, NYC, carries the sub-miniature SSO-7 transformer used in the Pearce and Page receivers. Price is $2.50. The popular Pearce receiver, in kit form, sells for $19.95 for the deluxe kit containing all parts (transistors and transformer) except the reed bank and relays. Complete kit, with reed bank and five relays is $36.95. The ESSCO THT receiver, which idles at .25ma, may be had with a B & S converter so that total battery complement is but three pencells, and sells for $34.95. This is built-up, factory tested. The Day modulator, with control unit, may be had in kit form for $24.95.

• • •

If you are short of lung power and long on cash, or want to dress up the next contest or public relations session, you will be interested in a 1,000-foot range, pistol-grip megaphone which is powered with but four size 'D' flashlight cells; 12½" long, it weighs 4½ pounds and has excellent directivity. Selling for $39.50, it may be obtained from Argonne Electronics Mfg. Corp., 165-11 South Road, Jamaica, 33, N.Y.

• • •

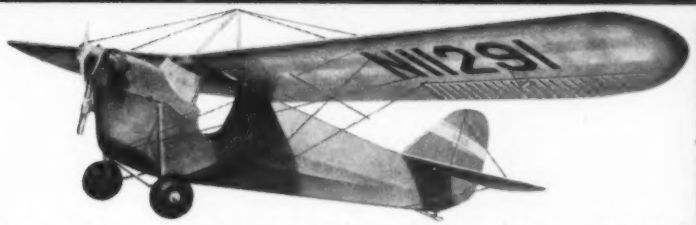
SIMPL/SIMUL—
Addition to September article to follow the paragraph subtitled: Control limitations.

This compromise can be eliminated by a pulser modification which is recommended for greater control stick effectiveness. This is detailed by Fig. 5 (Page 25, this issue); showing a pair of micro switches which are operated by full fore-aft stick travel. These are standard subminiature micro switches available through most radio supply houses. They mount first to the switch bracket, then the switch assembly is mounted to the 5 meg. pot shafts by the same screws which hold the coupling bracket. Purpose of the switches is to either add all of the trim pot resistance with full back stick, or to cut out all trim pot resistance with full forward stick. Therefore, full up and down elevator control is available regardless of trim pot setting. Without the switches, adjustment of the trim pot toward one rate extreme robbed the stick of some opposite rate control. With the switches, the trim knob still is effective during all stick travel except the very ends of travel. This modification has proved to be a great aid to aerobatic flying and probably will be found to be desirable sooner or later.

Increasing elevator control—substitution of a different rate control pot for the specified standard 250k unit can obtain greater elevator control—this is the 60 degree 100k pot available from Ace R/C, Higginsville, Mo.—by providing a much greater rate change for the normal amount of stick travel. With this . . .

Berkeley's CHAMPIONSHIP "1/2 A" FLYING SCALE

1" = 1' Scale . . . For Free-Flight . . . Controline . . . or Rubber Power!
For .035 to .049 Engines Free-Flight . . . .049 to .099 Engines Controline (except as noted)



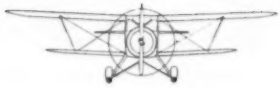
"WACO CABIN"

For ½A Free-Flight — Controline 1" Scale — 35" Wingspan

For "½A" Engines — .035 to .074

An unusual addition to our line of 1" Scale Championship designs. The "Waco" is easy to adjust and an unusually stable and high performance craft. As a Controline, its scale appearance and perfect proportions team up to make a fine flyer for everyday or Contest Flying Scale events.

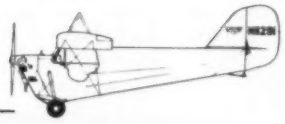
Kit No: 4-13
$3.95
less wheelpant material



AERONCA "C-3"

For ½A Free-Flight — Controline 1" Scale — 36" Wingspan

.020 to .051 Engines



Kit No. 4-12
$2.50

This kit now joins other Berkeley 1" Flying Scale designs, a series which has won this event at the Nationals consecutively since 1938. Structurally simple, the "C-3" can be assembled and flown in a few days time. Flies well with high or low power free-flight or controline. Plans show both types.

- Authentic Multi-color Decals
- Formed Gear, Rubber Wheels
- Die-Cut Balsa and Plywood Parts
- Metal Hardware and Covering Material
- Full Size Berkeley Detailed Plans!

$2.50
Kit No. 4-3

STINSON SENTINEL "L-5"

33½" Wingspan

Two place liaison and observation plane first flown in 1941. 1731 L-5's were built during World War II. Still in use by the U.S.A.F., Italian Air Force, and the Japanese Air Defense Force. Powered by 190 h.p. Lycoming. Maximum—129 m.p.h.—112 m.p.h. Cruising.

CESSNA L-19 "BIRD DOG"

36" Wingspan

Two seat observation plane used on a large scale in Korean War by the U.S. Army and the U.S. Marines. A large number of these are used by National Guard units. Powered by 213 h.p. Continental—130 m.p.h.

Kit No. 4-1
$2.95

PIPER "SUPER CRUISER"

35" Wingspan

$2.95 Kit No. 4-9

Three place cabin monoplane originally introduced as the "Cruiser" in 1940 with 75 h.p. then as the "Super Cruiser" after World War II, with 108 h.p. and then in 1948 as the four place "Family Cruiser". "Super Cruiser" had a maximum speed of 115 m.p.h.

CESSNA "180"

35" Wingspan

Four place cabin monoplane introduced in 1953 using the same wing as the "170" but with a re-designed fuselage and tail unit. Powered by a 225 h.p. Continental Engine. Maximum speed is 165 m.p.h.

$2.95
Kit No. 4-7

FAIRCHILD 24 "RANCHER"

36½" Wingspan

First produced in 1933 as a two-seater, in 1936 was introduced as a four place model using either a radial Warner engine or an in-line Ranger. Military version was known as the YC-61 "Forwarder" by the U.S.A.F. and the "Argus" by the R.A.F. Production resumed for business use after the war. 132 m.p.h.

Kit No. 4-5 **$2.50**

"AERONCA SEDAN"

34" Wingspan

Featured as a landplane, plans show pontoon details for those desiring the added thrill of water take-offs. Finished model is really spectacular

$2.50
Kit No. 4-8

"SUPER CADET"

35" Wingspan

Known as the "Interstate Cadet" before World War II and currently built by Call Aircraft Co. Two place—power was 65 h.p. It is now stepped up to 125 h.p. with an increase in maximum speed to 132 m.p.h.

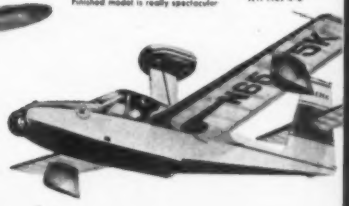
Kit No. 4-6 **$2.95**

$2.50
Kit No. 4-2

STINSON VOYAGER "150"

.34" Wingspan

Originally built by Stinson division of Consolidated Vultee. Added to the Piper line in 1948. Four place 165 h.p. Franklin engine. 143 m.p.h. maximum speed.



COLONIAL "SKIMMER"

(Not for Rubber Power) 33½" Wingspan

The hull design is perfect for realistic water take-offs.

Three place amphibian with retractable landing gear. Nose wheel protrudes when retracted to serve as a bumper. Powered by 125 h.p. Lycoming. 123 m.p.h.

Kit No. 4-11
$3.50

Since 1938—Leader in Creative Model Kits

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WEST HEMPSTEAD, NEW YORK, U.S.A.

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N. Y. Please include 25¢ packing & postage.

"BUHL PUP"

1⅛" Scale — 37½" Wingspan

Kit No. 4-10 **$3.50**

The "Buhl Pups" have been immortalized as one of the finest light planes ever designed. A number of full scale "Buhl Pups" are being rebuilt by "old timers". This truly different design makes an exceptionally realistic and fine flying model.

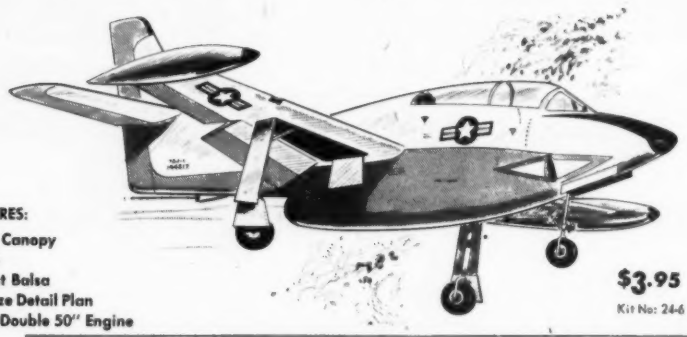
Each year from all over North America, the top Scale Model Builders come to the Nationals to fly in the exacting Flying Scale Event where models are judged for workmanship, authenticity and most of all — flying performance! Against this keenest of competition Berkeley Flying Scale designs have won 1st or 2nd in this event

at every Nationals' for the last 18 years!!

We are proud of this unprecedented record

5/8 SCALE DESIGNS

"MODELS OF THE MONTH" by Berkeley



Navy

"T2J"

North American Jet Trainer

The Navy's newest Jet Trainer powered by the new PSST "Double-50" for extra long flights. Using a double fuel charge, makes it practical for tether flight on monoline. A really beautiful airplane. Easy to build, — a fine flyer!

KIT FEATURES:

- Plastic Canopy
- Decals
- Die Cut Balsa
- Full-Size Detail Plan
- PSST "Double 50" Engine

$3.95

Kit No: 24-6

Powered by "Double-50" PSST Engine

22-1/2" Wingspan — 5/8" Scale — 23-3/4" Overall

FOR THE COX "PEE-WEE"

Grumman **F-11-1F** Navy

"TIGERCAT"

ducted fan jet

This model of Grumman F-11-1F "Tigercat" provides newest form of model propulsion for the first time in .020 power. Actually as the size of the engine is decreased, the thrust becomes proportionally higher, giving this model greater performance. It can be flown either free-flight or tethered.

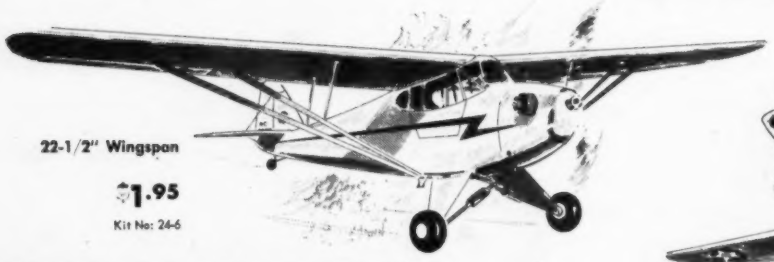
$2.95 Including Impeller Fan

Kit No: 24-8

KIT FEATURES:

- Plastic Canopy
- Decals
- Die Cut Balsa
- Aluminum Impeller Fan
- Full-Size Detail Plans

25" Overall



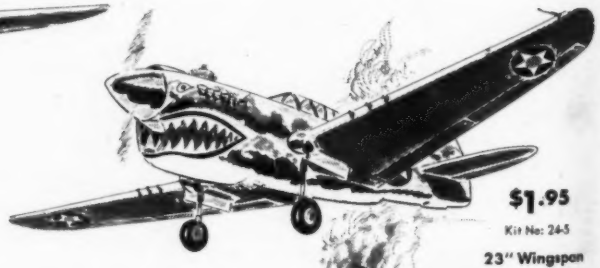
22-1/2" Wingspan

$1.95

Kit No: 24-6

PIPER "J-3"

World's most popular airplane now available for the Pee-Wee Engine. Easiest model to build and fly in the entire line.



$1.95

Kit No: 24-5

23" Wingspan

P-40 "WARHAWK"

Famous history-making World War II fighter with the "Flying Tiger" markings and decals.

Other .020 Engine Powered 5/8" Scale Designs in this Series:

"TRI-PACER" Kit No. 24-1 $1.95

"BIRD DOG" Kit No. 24-2 $1.95

"AIRCOUPE" Kit No. 24-4 $1.95

"CESSNA 172" Kit No. 24-3 $1.95

Also Available - for .020 Engines All Balsa

"BABY YANK"

$1.50

Kit No. 1-8

READY TO FLY:

For .020 Engines — 23" Wingspan

Features aluminum combination motor mount and landing gear. Just the model to get in the air in a hurry with the new Cox "Pee-Wee".

Since 1933 Leader in Creative Model Kits

BERKELEY MODELS INC.

WEST HEMPSTEAD, NEW YORK, U.S.A.

If no local dealer is convenient, mail orders will be filled by Berkeley Model Supplies, Dept. MA., West Hempstead, N. Y. Please include 25¢ packing & postage

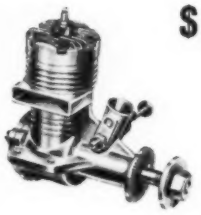
IN 1958 • FOX IS YOUR WINNING MOVE . . .

Fox Manufactures a Model to Fit the Requirements of Each Modeler

FOX 15
$6.95

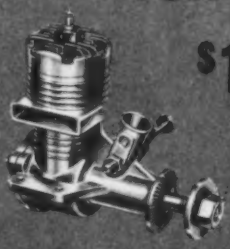
Most in Performance
Most in Value

FOX 19
$14.50



America's Finest 19

FOX 25
$14.50



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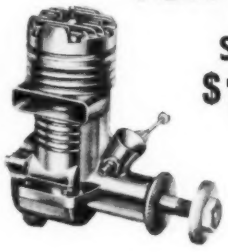

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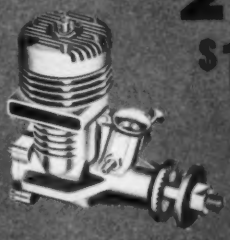

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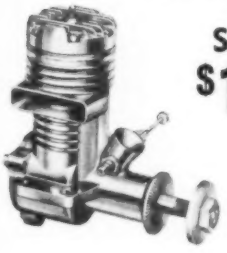

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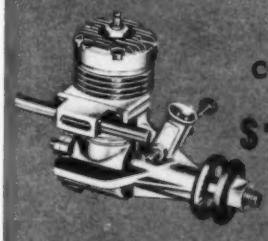

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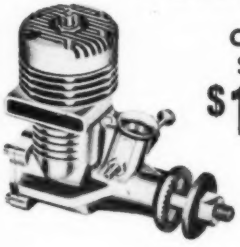

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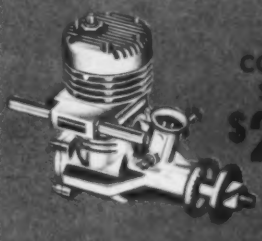

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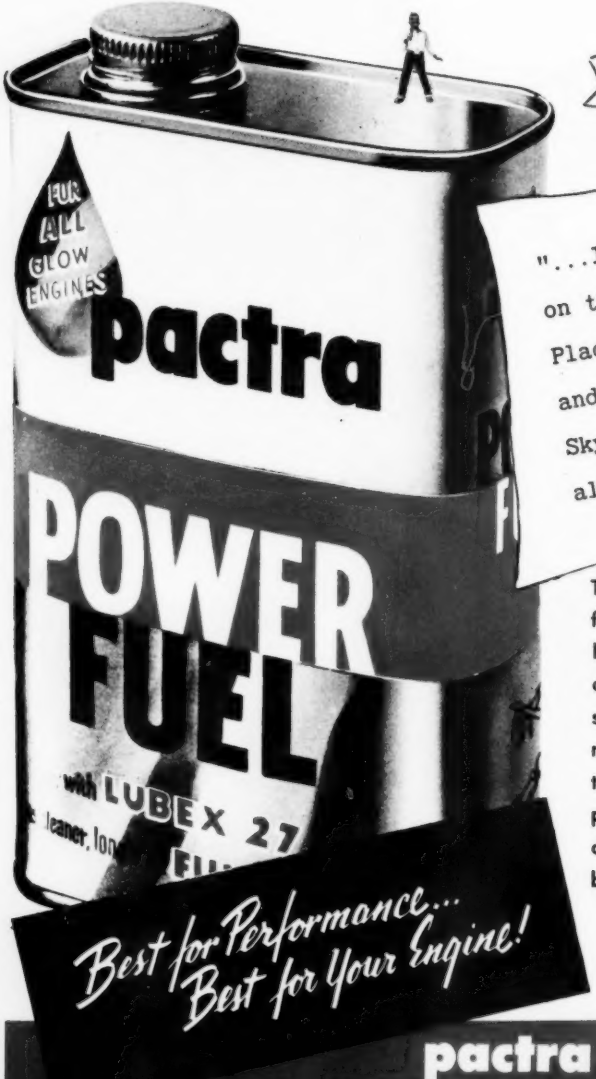

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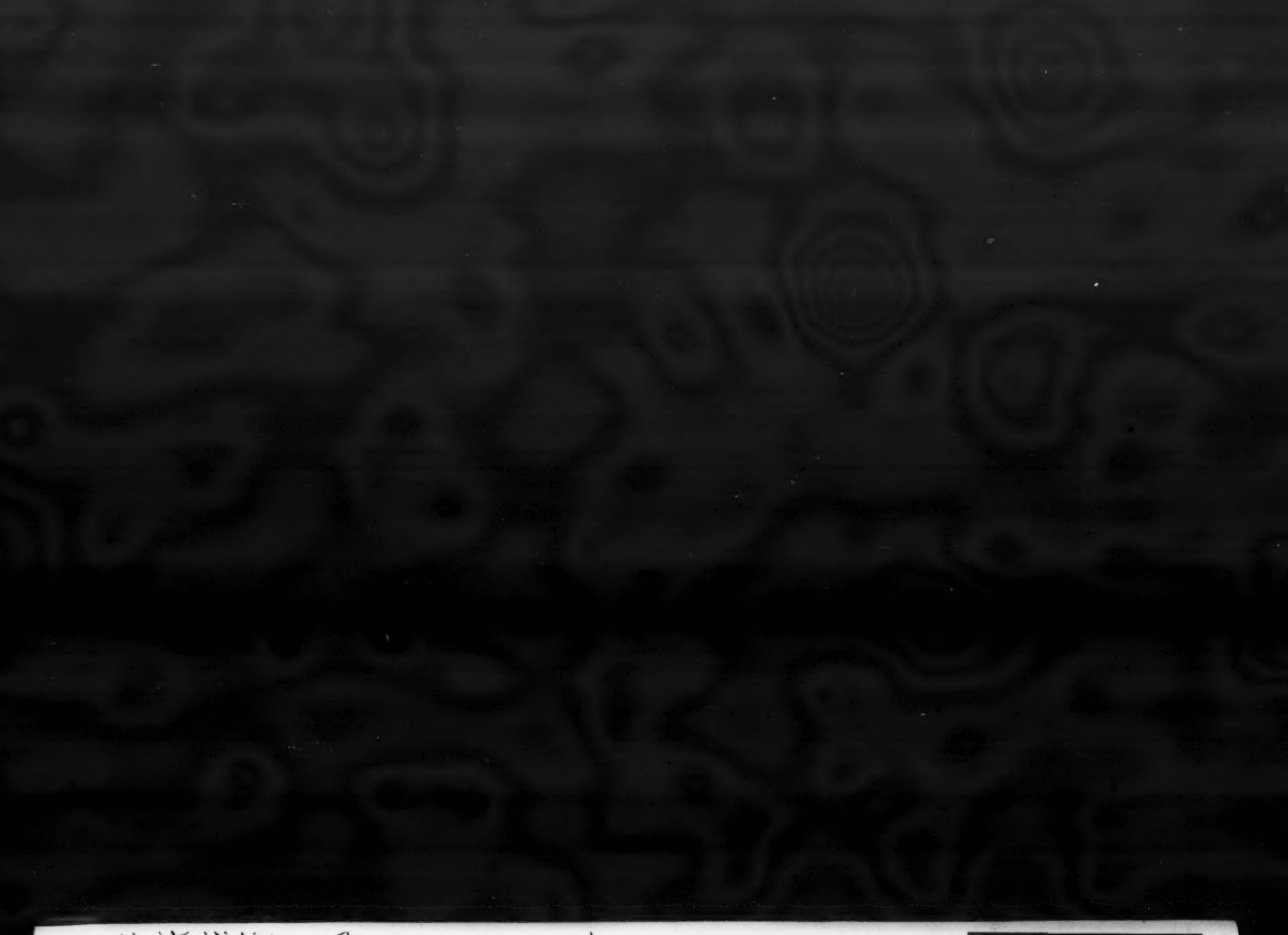
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